UDC 925.159:008.51-022:512
DOI https://doi.org/10.32782/health-2023.2.11

METHODS OF PHYSICAL REHABILITATION OF PATIENTS WITH ISCHEMIC STROKE

Mykhalchuk Nataliia Oleksandrivna,
Dr. in Psychology, Professor,
Head of the Department of English Language Practice and Teaching Methodology
Rivne State University of the Humanities
ORCID: 0000-0003-0492-9450
Researcher ID: A-9440-2019
Scopus AuthorID: 57214227898

Kharchenko Yevhen Mykolaiovych,
Doctor of Medicine, Professor,
Professor of the Department of Physical Rehabilitation and Ergo-Therapy
Rivne Medical Academy
ORCID: 0000-0002-4340-8503
Researcher ID: AAU-7523-2020
Scopus AuthorID: 57216872875

Ivashkevych Eduard Zenonovych,
Doctor of Psychology, Professor,
Professor of the Department of General Psychology and Psychological diagnostics
Rivne State University of the Humanities
ORCID: 0000-0003-0376-4615
Researcher ID: V-8872-2018
Scopus AuthorID: 57216880484

Ivashkevych Ernest Eduardovych,
PhD in Psychology, Professor's Assistant
of the Department of English Language Practice
and Teaching Methodology, Translator
Rivne State University of the Humanities
ORCID: 0000-0001-7219-1086
Researcher ID: F-3865-2019
Scopus AuthorID: 57216880485

Khupavtseva Nataliia Oleksandrivna,
Doctor of Psychology, Professor's Assistant
of the Department of General Psychology and Psychological diagnostics
Rivne State University of the Humanities
ORCID: 0000-0002-8883-7686
ResearcherID: AAC-2156-2019
Scopus AuthorID: 57221383831

*The **purpose** of our research is to develop and justify the functional method of using physical rehabilitation tools in restoring the motor functions of patients with ischemic stroke in the area of the internal carotid artery, taking into account the psychological state of the patient, the ontogenetic features of the restoration of his/her postural and dynamic functions, and the biomechanical laws of the formation of compensatory changes in the motor system of the individual.*

***Research methods**. In the system of measures for physical rehabilitation of patients with ischemic stroke, one of the most important points it is control of the patient's level of adaptation capabilities. Risk factors from the side of the cardiovascular system are: the degree of atherosclerosis, arterial hypertension, especially the increase in blood pressure over 200 mm Hg. art and diastolic is – more, than 110 mm Hg. art, increased blood viscosity, blood pressure fluctuations, for example, with heart rhythm disorders. Patients, having been included into the research, were selected by the method of randomization using a Table of random numbers (Paired Design Technology was used by us). Patients of the control group*

received a complex of rehabilitation measures using physical exercises (according to the classical method, proposed by us. To assess the psychological status of the patient, the eight-color test of M. Lüscher was used.

The results of the research. *According to all patients of the experimental and control groups, during the entire period of inpatient treatment, the following data were analyzed daily: well-being, frequency and nature of pain sensations, other complaints (shortness of breath, palpitations, sleep and mood disorders, tolerability of restorative treatment procedures). A clinical, functional and psychological examination was conducted for all patients before and after the complex rehabilitation course.*

Conclusions. *The study of the initial state of voluntary motility of ischemic stroke patients at the beginning of the physical rehabilitation course showed the presence of disorders of static and dynamic motor function of the arm, leg, coordinated action of the arms and legs, head, trunk, but quite different in their explanation in the studied groups of patients. The state of motor functions of patients with ischemic stroke is characterized in such a way: on the affected side, the maximum values of the volume of active and passive movements of strength and muscle tone are diagnosed in the "hemiparesis" subgroup, the smallest one – is in the "hemiplesia" subgroup. On the side of the lesion lacuna, the most pronounced muscle strength and tone are diagnosed in the subgroup "hemiparesis", the largest amount of active and passive movements, in turn, there are in the subgroup "plesia + paresis", "hemiparesis".*

Key words: *ishemic stroke the functional method, using of physical rehabilitation tools, compensatory changes in the motor system, dynamic motor function, "hemiparesis", "hemiplesia".*

Михальчук Н.О., Харченко Є.М., Івашкевич Е.З., Івашкевич Е.Е., Хупавцева Н.О. Методи фізичної реабілітації пацієнтів із ішемічним інсультом

Мета *нашого дослідження: розробити і обґрунтувати функціональну методику використання засобів фізичної реабілітації у відновленні рухової функції хворих ішемічним інсультом в районі внутрішньої сонної артерії з урахуванням психологічного стану пацієнта, онтогенетичних особливостей відновлення постуральної та динамічної функції і біомеханічних законів формування компенсаторних змін рухової системи особистості.*

Методи дослідження*. В системі заходів фізичної реабілітації хворих на ішемічний інсульт одним із найважливіших моментів є контроль рівня адаптаційних можливостей пацієнта. Факторами ризику з боку серцево-судинної системи є: ступінь вираження атеросклерозу, артеріальна гіпертензія, особливо – підвищення артеріального тиску понад 200 мм рт. ст. і діастолічного – понад 110 мм рт ст., збільшення в'язкості крові, коливання артеріального тиску, наприклад, при розладах серцевого ритму. Пацієнти, які були включені до дослідження, були відібрані методом рандомізації за допомогою Таблиці випадкових чисел (нами використовувалася технологія парного проєктування). Пацієнти контрольної групи отримували комплекс реабілітаційних заходів з використанням фізичних вправ (за запропонованою нами класичною методикою). Для оцінки психологічного стану хворого використовувався восьмикольоровий тест М. Люшера.*

Результати дослідження. *У всіх хворих експериментальної і контрольної груп протягом усього періоду стаціонарного лікування щодня аналізувалися: самопочуття, частота і характер больових відчуттів, інші скарги (задишка, серцебиття, порушення сну і настрою, переносимість процедур відновлювального лікування). Для всіх хворих до і після курсу комплексної реабілітації проводилися клініко-функціональне і психологічне обстеження.*

Висновки. *Вивчення вихідного стану довільної моторики хворих на ішемічний інсульт на початку проведення курсу фізичної реабілітації свідчило про наявність розладів статичної та динамічної рухової функції руки, ноги, узгодженої дії рук і ніг, голови, тулуба, але досить різних за своєю експлікацією в досліджуваних групах хворих. Стан рухової функції хворих ішемічним інсультом характеризується таким чином: на ураженій стороні максимальні значення обсягу активних, пасивних рухів сили і тонусу м'язів діагностуються в підгрупі «геміпарез», найменші – в підгрупі «геміплезії». На стороні лакуни ураження найбільшою мірою виражені сила і тонус м'язів діагностуються в підгрупі «геміпарез», найбільший обсяг активних і пасивних рухів, в свою чергу, – у підгрупі «плезія + парез», «геміпарез» тощо.*

Ключові слова: *ішемічний інсульт, функціональний метод, застосування засобів фізичної реабілітації, компенсаторні зміни рухової системи, динамічна рухова функція, «геміпарез», «геміплегія».*

Introduction

Significant spread of vascular diseases of the brain, which is one of the main causes of disability and mortality, makes them one of the most pressing problems of modern neurology in Ukraine. The incidence of ischemic stroke in Ukraine is 390 per 100,000 population. In Kyiv, according to the Ambulance Service, 50-60 strokes have been registered daily in recent years. At the same time, disability after a stroke is 3,2% of cases per 10,000 population, no more than 17,2% of people return to their main place of work, and full physical rehabilitation, according to sociological data, is achieved in only 12% of cases (Kharchenko & Komarnitska, 2021; Mykhalchuk, Pelekh, Kharchenko, Ivashkevych Ed., Ivashkevych Er., Prymachok, Hupavtseva & Zukow, 2020).

The severity of motor disorders, aggravating for this patient and others, explains the desire of the most researchers, primarily to find ways to correct this defect (Онуфрієва & Івашкевич Ед., 2021). Physical rehabilitation, in a modern sense, should have the aim at maximizing the use of adaptive and compensatory functions of a sick person in the fight against the disease (Харченко & Курииця, 2021). One of the

main principles of physical rehabilitation is also taking into account the patient's personality, and this determines the close relationships in the rehabilitation program of biological, psychosocial and psychological-pedagogical methods (Hardeman, Medina & Kozhimannil, 2016).

Also of great importance is the methodological side of the process of psychomotor retraining. The existing classifications of motor disorders do not adequately reflect the complex pathogenetic mechanisms of the formation of post-stroke motor deficit; the clinical structure of motor deficit is insufficiently studied, the peculiarities of the psychological state of the patient, which arose as a result of the disease, are not taken into account (Khwaja, 2012). Nowadays, with all the variety of techniques doctors use to restore lost motor function of patients with ischemic stroke, there is no a single system of differentiated use of means and methods of physical rehabilitation, which take into account not only the development of stroke, but also the development of normal motor function in the process ontogenesis, the possibility of a rational combination of the advantages of different schools of movement recovery (kinesitherapy) (Hayden, Farrar & Peiris, 2014; Kharchenko & Vashchenko, 2021).

The object of the research is physical rehabilitation of patients with ischemic stroke who have lesions in the area of the internal carotid artery.

The subject of the research includes methods of physical rehabilitation of patients with ischemic stroke, taking into account the degree of impairment of motor functions and individual psychological characteristics at the inpatient stage of treatment of patients.

The purpose of the research: to develop and justify the functional method of using physical rehabilitation tools in restoring the motor functions of patients with ischemic stroke in the area of the internal carotid artery, taking into account the psychological state of the patient, the ontogenetic features of the restoration of his/her postural and dynamic functions, and the biomechanical laws of the formation of compensatory changes in the motor system of the individual.

According to the WHO, the incidence of stroke varies from 1,5 to 7,4 per 1,000 population each year, and in Europe stroke affects more than 1 million people each year (these data were obtained through clinical trials during 2007-2018). It has been established that 1/3 of patients who have suffered because of a stroke are of working age, but only 20% of them return to work. Mortality due to this disease, according to various authors, is from 17 to 34% in the first 30 days and 25-40% during the first year of the disease. Currently, there is a remarkable trend towards some reduction in mortality from ischemic stroke due to early and accurate diagnosis, due to the development of a system of intensive care for stroke (Onufriieva, Chaikovska, Kobets, Pavelkiv & Melnychuk, 2020).

The most frequent and severe consequence of cerebral ischemic stroke is the disorder of the motor functions of the person. Characteristic feather is the polymorphism of motor disorders of patients with cerebral ischemic stroke. In this case, general for patients is only the loss or violation of arbitrary actions (in the cases of hemiparesis or hemiplezia). Other clinical symptoms are largely variable and depend on a certain extent of the size of affected area, also its localization. According to various authors, persistent disturbances of motor function are also observed in the first days after the disease (in 70-80% of cases of patients who had the ischemic stroke).

Disorders of voluntary movements in ischemic stroke can be considered as a result of inconsistency of complex motor programs which provide arbitrary motility of the individual. The implementation of such programs is associated primarily with the functioning of complex multifunctional systems, in which the leading role belongs to the central motor neuron, which has numerous connections in subcortical formations, for example – with the reticular formation of the brain stem (Villar, Blanco & del Campo, 2015).

Adequate tonal response of the muscular system leads to the formation of a pathological static stereotype. The laws of constructing a psychomotor stereotype are based on uninhibited innate reflexes, but they are adaptive in the nature and sanogenetic in their direction. Given the theoretical analysis of the scientific literature, we propose psychological principles for the formation of general compensatory reactions of the patient in a case of physical rehabilitation of patients with ischemic stroke:

1. *The principle of actualization of the defect* (feedback of psychomotor action, which originates from various receptors, informs the integrative centers about the existence of a certain defect).

2. *The principle of progressive mobilization of compensatory mechanisms of psychomotor activity* (compensation is carried out with the gradual connection of the nervous system until the doctor achieves the desired effect).

3. *The principle of continuous reverse concentration of compensatory mechanisms of the personality psyche* (the impulse to the impact of the defect enters the central nervous system continuously).

4. *The principle of authorizing the compensatory mechanisms of the individual psyche* (compensatory mechanisms begin to work in the conditions of achieving a pathological impulse of a certain threshold).

5. *The principle of relative stability of the compensatory mechanisms of the individual psyche* (compensatory mechanisms are activated and slowed down gradually).

Methods of the research

Psychological and pedagogical experiment. Patients, having been included into the research, were selected by the method of randomization using a Table of random numbers (Paired Design Technology was used by us). The main clinical characteristics are taken into account: age, sex, duration of the disease (patients were divided into experimental and control groups for the purpose of comparison, increasing the statistical reliability of the obtained empirical results). In addition to drug therapy, the complex of restorative measures in both groups included treatment with the surrounding space, physical exercises, magnetic therapy, and heat treatment for the large joints of the affected limbs. Patients of the experimental group underwent a course of functional physical rehabilitation, based on the sanogenetic approach, according to the stages of postnatal ontogenesis, taking into account the peculiarities of the patients' psycho-emotional state.

Patients of the control group received a complex of rehabilitation measures using physical exercises (according to the classical method, proposed by us (Роговик, 2013; Харченко & Михальчук, 2022b)). In addition, in the control group patients were prescribed massage of the affected limbs according to our method (Харченко & Михальчук, 2022a). Massage was not performed in the experimental group.

All restorative measures in groups were carried out individually under daily control of heart rate, by providing autogenic training. Exercise classes (one time a day) were not conducted with patients, having been included into the study in the case of: systolic blood pressure at the rest of the day of the class above 200 mm Hg. art., diastolic blood pressure – above 110 mm Hg. art.; decrease in orthostatic blood pressure by 20 mm Hg. art.

All patients of the experimental and control groups, during the entire period of inpatient treatment, were analyzed daily by the following characteristics: well-being, frequency and nature of pain sensations, other complaints (shortness of breath, palpitations, sleep and mood disorders, tolerability of restorative treatment procedures). A clinical, functional and psychological examination was organized for all patients before and after the complex of rehabilitation course.

The research of psychological characteristics.

To assess the psychological status of the patient, the eight-color test of M. Lüscher (Цветовой тест М. Люшера, 2012) was used, based on the unconscious reactions of the patient. The eight-color test is widely known in the practice of Psychodiagnostics. It belongs to highly effective projective methods and it is intended for studying the situational psycho-emotional state of the person according to its adaptation to various socio-psychological situations.

This test is based on the assumption that the choice of color reflects the focus of the respondent on a certain activity, mood, functional state. Also, this test has the aim at determining the most stable traits of the person. The advantages of M. Lüscher's test (Цветовой тест М. Люшера, 2012) are the independence of the results from the age, gender and educational characteristics of the respondent, the possibility of identifying with its help both stable personal and characteristic traits, and features of the current psycho-emotional state, which is especially important in the conditions of monitoring the effectiveness of treatment. Thus, M. Lüscher (Цветовой тест М. Люшера, 2012) assumed, that if the respondent is offered to evaluate a color as one that is not associated with any of his/her essential status, personally significant things, then the respondent will focus on the objective structure of the color, and if the signal value of a certain color coincides with the possibilities and the leading setting of his/her organism, then this particular color will be rated as the most pleasant one. The color preference test is based on these two assumptions. All this allows us the use of this technique in the psychodiagnostic practice of medical rehabilitation of this category of patients. The final conclusion is given by the doctor on the basis of the integration of test indicators with clinical data.

The testing procedure consists in ranking of 8 main colors (blue, green, red, yellow, purple, brown, black, gray) at the request of the respondent. Depending on the location in the row of 4 main ones (blue, green, red, yellow) and 4 additional colors (purple, brown, black, gray), the degree of dissatisfaction, anxiety, the presence of a source of stress, compensation options, etc. is assessed. We will describe in more detail which indicators of this psychodiagnostic technique are aimed at assessing.

Mental characteristics of the person.

When performing the test by a healthy, balanced, conflict-free subject, preference is given to primary

colors, which should occupy the first 4-5 places. If they are located somewhat differently, then this may indicate some unsatisfied need, the presence of mental or physiological discomfort, which, in turn, may be a source of stress, anxiety, etc.

Also, we proposed indicators of anxiety and compensation.

1. If at least one of the main colors is in the last three places, then it and the following colors indicate a state of anxiety. The method of compensation of anxiety is determined by the characteristic of the color located at the first position.

2. If, under the conditions of anxiety, one of the main colors is in the first place, then compensation is considered more successful than in the case of an additional color, which indicates the inadequacy, failure of compensatory behavior.

3. The presence of gray, brown or black at the beginning of the color range means a negative attitude towards the person's life. If one of these colors is at the second or third place, then it and all other colors are to its left, and they are considered as some compensations.

4. If gray, brown or black colors occupy one of the first three positions, and at the same time there are no primary colors in any of the last three positions, then whichever color occupies the last position should be considered as an indicator of the source of the alarm.

Unsatisfied need, the presence of anxiety can be suppressed by the individual to such an extent that he/she ceases to be aware of them, but can feel them in the form of a vague restlessness. When conducting M. Lüscher's test (Цветовой тест М. Люшера, 2012), our attention was drawn to the group of colors (3, 4 or 4, 3) – they are red, yellow; and 1, 7 and 7, 1 are blue, black, which indicate the instability of self-regulation. Especially if group 3, 4 or 4, 3 were at the end, and 1, 7 or 7, 1 at the beginning of the row. And also on the location there are 3 main colors: green (2), red (3) and yellow (4), which were named as so called "working group". Colors that stand together and are placed close to the beginning of the row indicate the ability of the individual to maintain good performance (productivity) for a certain time.

If these colors are far from each other, then the prognosis of the task facing the individual is not very good.

The activity was done in pairs in a row of pairs of colors, having been placed according to the degree of preference. The first two colors were marked with (+), the next two ones – with (x), the third pair was marked with (=), and the fourth one – with (-). To each group of two colors M. Luscher (Цветовой тест М. Люшера, 2012) assigns its structural meaning, which does not depend on its place in the row. But depending on the location in the row, which signs as -1-, x, =, – will denote a group of two colors, its functional interpretation will change. In the Table of interpretation, the functions are designated in such a way:

+ functions: actualization of desired goals, or performance of the behavior dictated by desired goals;

x functions: the existing state of affairs and behavior can be regarded as appropriate one under the conditions of the existence of this state of affairs;

= functions: restraining characteristics or behavior that can be considered as inappropriate one under the conditions of a given state of affairs;

– functions: characteristics are denied and inhibited, or features that cause anxiety, are significantly actualized;

+ – functions: actualization of the problem or behavior that was caused by stress.

The following rules were proposed by us during testing:

1. The respondent followed only the rules established over many years, in particular, those color shades and did not imagine, for example, a lighter, more "beautiful" color.

2. Each color was chosen separately.

3. The respondent was absolutely free to choose which of the offered colors he/she liked or disliked at all.

4. The respondent was warned that when choosing a color, he/she should not associate it with any external object (weather, clothes, etc.).

The testing procedure is organized in such a way. The respondent chooses colors in descending the order of preference: the first, № 1, it is the color that he/she likes most of all. Then, № 2, it is the color that is the second one and the most attractive. Under № 8 it is the color that causes the least (or the greatest dislike). Thus, 8 positions are formed. During testing, two procedures were carried out with the interval of 2-3 minutes.

Medical and biological research methods.

In the system of measures for physical rehabilitation of patients with ischemic stroke, one of the most important points it is control of the patient's level of adaptation capabilities. *Risk factors from the side of the cardiovascular system* are: the degree of atherosclerosis, arterial hypertension, especially the increase in blood pressure over 200 mm Hg. art and diastolic is – more, than 110 mm Hg. art, increased blood viscosity, blood pressure fluctuations, for example, with heart rhythm disorders. Exceeding the

patient's functional capabilities increases the likelihood of repeated disorders of cerebral blood circulation, the occurrence of cardiovascular complications, which also worsens the recovery process in terms of a stroke. The change in the functional state of the organism is reflected to a greater extent in the less stable position of the psychomotor act – its vegetative support, etc.

Results and their discussion

For our research we proposed "The author's methodology of measuring the number of active movements in the joints of the patient's limbs" (Table 1).

Also, we proposed "Six-point scale for assessing muscle strength" (Table 2).

The empirical research was provided at the Department of Human Health and Physical Therapy of the International University of Economics and Humanities named after Academician Stepan Demyanchuk on the basis of Ternopil Regional Municipal Clinical Psychoneurological Hospital, Neurological Department for Patients with Cerebral Circulatory Disorders (Neuroreability Unit).

In accordance with the purpose of the research and in order to solve the tasks, in our experiment were participated 50 patients with ischemic stroke who had disturbances in the area of the internal carotid artery in the acute and residual period, who were treated at the Ternopil Regional Communal Clinical Psycho-neurological Hospital during the period from January to December, 2022.

We will describe the data obtained by us from the study of the state of motor activity of patients with cerebral ischemic stroke by the Bobabl Scale. Thus, assessing the quality of life of patients by the Bobabl Scale, the following results were obtained, given in Table. 3.

The differences between the obtained results of the respondents of the experimental and control groups are statistically significant (at the level of reliability $p<0,05$ according to the Student's t-criterion). As we

Table 1

The methodology of measuring the number of active movements in the joints of the patient's limbs

Movement which has measured and the plane of motor activity	Starting position the patient	Indexes of the volume of normal movements
Flexion and extension in shoulder joint; sagittal plane	Sitting or lying on your back, a hand is along the torso, unbent in the elbow joint	Bending – 180 times Extension – 60 times
Withdrawal of the arm in the shoulder joints; a frontal plane	Sitting or lying on your back, hand along the torso, unbent in the elbow joint	Bending – 180 times Extension – 180 times
Internal and external rotation in the shoulder joint; transverse plane	Lying on the abdomen, removal in the shoulder joint – 90 times, flexion in the elbow joint – 90 times, pronated forearm	External rotation – 90 times Internal rotation – 90 times
Flexion in the elbow joint; sagittal plane	Sitting or lying down, forearm is supine	External rotation – 150 times Internal rotation – 150 times
Pronation and supination of the forearm; transverse plane	Sitting or lying down, flexion of the elbow joint – 90 times, wrist joint in a neutral position (intermediate between pronation and supination), fingers are gripping the pencil	Pronation – 90 times Supination – 90 times
Flexion and extension in the wrist joint; sagittal plane	Flexion in the elbow joint – 90 times, forearm pronated	Bending – 80 times Extension – 80 times
Flexion in the hip joint during extension in the knee joint; sagittal plane	Lying on your back or side, a leg is stretched at the knee joint	Bending – 90 times Extension – 90 times
Withdrawal in the hip joint; a frontal plane	Lying on your back or side, a leg is stretched at the knee joint	Bending – 45 times Extension – 45 times
External and internal rotation in the hip joint; transverse plane	Lying on your back or sitting, flexion is in the hip joint and knee joint – 90 times	External rotation – 45 times Internal rotation – 35 times
Flexion is in the knee joint; sagittal plane	Lying on your stomach or sitting, the hip joint is in a neutral position	Bending – 135 times Extension – 135 times
Posterior and plantar flexion in the ankle joint; sagittal plane	Lying on your back or sitting, bending at the knee – 90 times	Тильне згинання – 20 разів, підошовне згинання – 50 разів Rear flexion – 20 times Plantar flexion – 50 times

Table 2

Six-point scale for assessing muscle strength

Points	Muscle strength
0	There are no signs of stress when the person is trying to perform arbitrary movement
1	The feeling of tension when the person is trying to make an arbitrary movement
2	A movement in full in the conditions of physical unloading
3	A movement in full under the action of gravity
4	A movement in full under the action of gravity and slight external resistance
5	A movement in full under the action of force with maximum external resistance

can see from Table 1, the patients of the hemiplesia subgroup were quite active, mostly only in a horizontal position, with the least effective use of the affected side. In the groups "plesia + paresis" the activity of patients was greater, but the use of preserved movements of the affected side was very ineffective. The absence of patients who independently maintain a vertical position, especially in the subgroup "hemiparesis", in the most cases was determined not by the disease, but by delayed position of no verticalization of patients, which was not carried out.

Also, we will describe our research data of the psycho-emotional state of patients with ischemic stroke. As a result of the initial study of the psycho-emotional state of patients with ischemic stroke we used M. Luscher test revealed the presence of a psychological source of stress (in the form of fear, anxiety, fatigue, dissatisfaction, etc.) of 40 respondents.

The analysis of the colors by group 3, 4 and 1, 7, as well as by the "working group" 2, 3, 4, that characterizes the presence of disorders of self-regulation and the ability to perform effective test activities (under a certain location in one line), respectively, 43 patients with ischemic stroke violation of autonomic regulation of personality and reduced ability to perform effective actions (low motivation to do the exercises).

For example, let us look at the test protocol № 23 (the patient is 56 years old). The diagnosis of this patient is ischemic stroke, cerebral infarction in the middle cerebral artery; left-side hemiparesis. Occasionally complains of dizziness, general weakness, poor tolerance from the point of view of exercises and lack of interest in life. The patient did not complain before the test. The ranking of the cards was given by preference: 5, 2, 1, 7, 4, 0, 6, 3 – the first option and 2, 5, 1, 7, 4, 0, 6, 3 – the second one.

The last option was chosen for decryption. In the test report groups 3, 4 (the main, light colors) are located in the second half of the row, and 1, 7 (dark colors) there are in the first half of the row. The "working group" of colors – 2, 3, 4 – is not together, but scattered throughout the series. In the last position it is the main red color (3), so, there is a rejection, the color is rejected. In the first position it is the main color – green (2) – it is a compensation for anxiety. In this case it is seen as a need for self-affirmation. The following interpretation of the test results was the most possible: "A disorder of autonomic regulation has been diagnosed, there are signs of fatigue and a very serious source of stress with normal compensation. The source of stress is related to the inhibition of physical and sexual needs, with insecurity. Also, we diagnosed decreased vital energy, helplessness, inability to influence events that cause irritation, discomfort. The patient is sensitive to criticism, vulnerable.

Let us look at another protocol № 42, of a patient of 48 years old. The diagnosis of him is ischemic stroke, cerebral infarction in the left middle cerebral artery. Right hemiparesis. He does not express active complaints. Cards were ranked in order of preference: 2, 4, 7, 3, 5, 1, 6, 0 and 5, 4, 3, 6, 0, 1, 2, 7. Colors 3, 4 and 1, 7 were located in different ends of the color range. The main colors (blue, green) are placed at 6 and 7 positions, respectively (there is a rejection of these colors). In position 1, as the compensation for the rejection of colors is purple (5) – as a rule, it should be located in the indifferent zone or deviate. The main colors are: blue (1) and green (2) are in the indifferent zone and the zone of rejection. Analyzing the test results, we can assume the presence of disorders of autonomic regulation and sources of stress of this person. Deciphering / – – / functions were indicated: the source of stress is frustration caused by limited freedom of actions, the desire for independence. Interpretation of / + – / functions emphasizes the patient's desire to avoid criticism, any restrictions of personal freedom.

According to all patients of the experimental and control groups, during the entire period of inpatient treatment, the following data were analyzed daily: well-being, frequency and nature of pain sensations, other complaints (shortness of breath, palpitations, sleep and mood disorders, tolerability of restorative treatment procedures). A clinical, functional and psychological examination was conducted for all patients before and after the complex rehabilitation course.

Table 3

Active movements demonstrated by the patients with ischemic stroke at the beginning of our research (by the Bobabl Scale) (M ± т)

Indicator	The number of patients in the group of "hemiplesia", who have this skill (%)	The number of patients in the group of "hemiplesia+paresis", who have this skill (%)	The number of patients in the group of "hemiparesis", who have this skill (%)
Lifting the head in a stomach position (the main group)	23,3±6,2	34,6±5,0	62,5±4,1
Lifting the head in the abdominal position (the control group)	28,9±1,2	30,6±5,7	64,8±4,0
Lifting the head in a supine position (the main group)	35,9±7,1	56,1±8,2	62,1±5,9
Lifting the head in a position on a back (the control group)	32,4±4,7	55,2±5,0	69,7±5,2
Turn from the back to the side through the affected side (the main group)	19,4±3,7	52,4±6,0	71,3±5,1
Turn from the back to the side through the affected side (the control group)	23,8±9,0	56,1±2,5	77,6±3,0
Turn from the back to the side through the unaffected side (the main group)	3,2±5,1	22,6±2,7	50,2±7,3
Turn from the back to the side through the unaffected side (the control group)	2,7±4,9	23,9±4,0	54,6±1,1
Turn from the stomach to the back (the main group)	21,6±3,4	32,8±0,9	67,8±3,5
Turn from the stomach to the back (the control group)	22,1±1,0	37,5±2,6	62,5±1,0
Crawling on the stomach (the main group)	0	14,3±1,5	37,2±0,6
Crawling on the stomach (the control group)	0	17,1±0,3	33,1±2,7
Maintaining the position of the crayfish (the main group)	0	9,1±0,5	10,7±5,3
Maintaining the position of the crayfish (the control group)	0	11,9±2,7	11,7±5,8
Moving crayfish (the main group)	0	6,5±0,7	11,2±2,5
Moving crayfish (the control group)	0	7,5±2,3	12,4±3,1
Sitting on a chair (the main group)	0	10,2±1,4	12,9±0,7
Sitting on a chair (the control group)	0	11,5±2,2	11,4±7,5
Sitting from a supine position through the support of the elbows (the main group)	0	7,3±0,3	7,8±1,9
Sitting from a supine position through the support of the elbows (the control group)	0	7,4±7,6	9,5±0,4
Getting up from your knees (the main group)	0	1,4±5,8	0
Getting up from your knees (the control group)	0	1,8±9,2	0
The ability to stand up (the main group)	0	0	0
The ability to stand up (the control group)	0	0	0
Independent walking (the main group)	0	0	0
Independent walking (the control group)	0	0	0

Conclusions

The study of the initial state of voluntary motility of ischemic stroke patients at the beginning of the physical rehabilitation course showed the presence of disorders of static and dynamic motor function of the arm, leg, coordinated action of the arms and legs, head, trunk, but quite different in their explanation in the studied groups of patients.

The state of motor functions of patients with ischemic stroke is characterized in such a way: on the affected side, the maximum values of the volume of active and passive movements of strength and muscle tone are diagnosed in the "hemiparesis" subgroup, the smallest one – is in the "hemiplesia" subgroup. On the side of the lesion lacuna, the most pronounced muscle strength and tone are diagnosed in the subgroup "hemiparesis", the largest amount of active and passive movements, in turn, there are in the subgroup "plesia + paresis", "hemiparesis".

LITERATURE

1. Онуфрієва Л., Івашкевич Ед. The development of learner's autonomy by the way of the formation of social intelligence. *Збірник наукових праць «Проблеми сучасної психології»*. Вип. 51. 2021. С. 9–32. URL: https://doi.org/10.32626/2227-6246.2021-51.9-32.

2. Роговик Л.С. Шкала психомоторної активності. 2013. URL: ecopsy.com.ua/data/zbirki/2003_01/sb01_57.pdf.

3. Харченко Є., Курися Д. Psychological ways of providing primary medical sanitary help for people who use psychoactive substances. *Збірник наукових праць «Проблеми сучасної психології».* Вип. 51. 2021. С. 215–240. URL: https://doi.org/10.32626/2227-6246.2021-51.215-240.

4. Харченко Є.М., Михальчук Н.О. Методика вимірювання обсягу активних рухів в суглобах кінцівок хворого на ішемічний інсульт. Методичний посібник. Рівне : РДГУ, 2022a. 108 с.

5. Харченко Є.М., Михальчук Н.О. Функціональна методика фізичної реабілітації хворих на ішемічний інсульт. Методичний посібник. Рівне : РДГУ, 2022b. 134 с.

1. Цветовой тест М. Люшера. 2012. URL: https://psyfactor.org/lib/lusher.htm.

6. Hardeman Rachel R., Medina Eduardo M., Kozhimannil Katy B. Structural Racism and Supporting Black Lives – The Role of Health Professionals. *New England Journal of Medicine.* Vol. 375(22). 2016. P. 2113–2115. URL: https://doi.org/10.1056/NEJMp1609535.

7. Hayden F.G., Farrar J., Peiris J.S. Towards improving clinical management of Middle East respiratory syndrome coronavirus infection. *Lancet Infect Dis.* Vol. 14(7). 2014. P. 544–546. URL: https://doi.org/10.1016/S1473-3099(14)70793-5.

8. Kharchenko Ye., Komarnitska L. Theoretical foundations of psychological and physical rehabilitation of patients with ischemic stroke. *Збірник наукових праць «Проблеми сучасної психології»*. Вип. 52. 2021. С. 275–298. URL: https://doi.org/10.32626/2227-6246.2021-52.275-298.

9. Kharchenko Ye., Vashchenko I. The peculiarities of the correction of psychomotor disorders of patients with ischemic stroke: the psychological aspect. *Збірник наукових праць «Проблеми сучасної психології»*. Вип. 53. 2021. С. 284–305. URL: https://doi.org/10.32626/2227-6246.2021-53.284-305.

10. Khwaja A. KDIGO clinical practice guidelines for acute kidney injury. *Nephron Clin Pract.* Vol. 120. 2012. P. 179–84.

11. Mykhalchuk N., Pelekh Yu., Kharchenko Ye., Ivashkevych Ed., Ivashkevych Er., Prymachok L., Hupavtseva N., Zukow W. The empirical research of the professional reliability of 550 doctors during the COVID-19 pandemic in Ukraine (March-June, 2020). *Balneo Research Journal.* Vol. 368, 11(3), September 2020. 2020. P. 393–404. URL: http://dx.doi.org/10.12680/balne.

12. Onufriieva L., Chaikovska O., Kobets O., Pavelkiv R., Melnychuk T. Social Intelligence as a Factor of Volunteer Activities by Future Medical Workers. *Journal of History Culture and Art Research.* Vol. 9(1). 2020. P. 84–95. URL: http://dx.doi.org/10.7596/taksad.v9i1.2536

13. http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=3&SID=C2rooGzb9Eyq4lCkoTY&page=1&doc=1.

14. Villar J., Blanco J., del Campo R. Spanish Initiative for Epidemiology, Stratification & Therapies for ARDS (SIESTA) Network. Assessment of PaO/FiO for stratification of patients with moderate and severe acute respiratory distress syndrome. *BMJ Open.* Vol. 5(3). 2015. URL: http://10.1136/bmjopen-2014-006812.

REFERENCES

1. Cvetovoj test M. Lyushera *[M. Luscher Color Test].* (2012). Electronic resource. Retrieved from: https://psyfactor.org/lib/lusher.htm.

2. Hardeman, Rachel R., Medina, Eduardo M. & Kozhimannil, Katy B. (2016). Structural Racism and Supporting Black Lives – The Role of Health Professionals. *New England Journal of Medicine, 375 (22),* 2113–2115. Retrieved from http://10.1056/NEJMp1609535.

3. Hayden, F.G., Farrar, J. & Peiris, J.S. (2014). Towards improving clinical management of Middle East respiratory syndrome coronavirus infection. *Lancet Infect Dis., 14(7)*, 544-546. Retrieved from http://10.1016/S1473-3099(14)70793-5.

4. Kharchenko, Ye. & Kurytsa, D. (2021). Psychological ways of providing primary medical sanitary help for people who use psychoactive substances. *Zbirnyk naukovykh prats «Problemy suchasnoi psykholohii» [Collection of scientific issues "Problems of modern Psychology"], 51,* 215–240. Retrieved from https://doi.org/10.32626/2227-6246.2021-51.215-240

5. Kharchenko, Ye. & Komarnitska, L. (2021). Theoretical foundations of psychological and physical rehabilitation of patients with ischemic stroke. *Zbirnyk naukovykh prats «Problemy suchasnoi psykholohii» [Collection of scientific issues "Problems of modern Psychology"]*, *52*, 275–298. Retrieved from https://doi.org/10.32626/2227-6246.2021-52.275-298

6. Kharchenko, Ye.M. & Mykhalchuk, N.O. (2022a). Metodyka vymiriuvannia obsiahu aktyvnykh rukhiv v suhlobakh kintsivok khvoroho na ishemichnyi insult [The Methodology of measuring the amount of active movements in the joints of the patient's limbs]. Methodical manual. Rivne: RDGU. 108 p.

7. Kharchenko, Ye. & Mykhalchuk, N. (2022b). Funktsionalna metodyka fizychnoi reabilitatsii khvorykh na ishemichnyi insult [Functional Methodology of Physical Rehabilitation of patients with ischemic stroke]. Methodical manual. Rivne: RDGU. 134 p.

8. Kharchenko, Ye. & Vashchenko, I. (2021). The peculiarities of the correction of psychomotor disorders of patients with ischemic stroke: the psychological aspect. *Zbirnyk naukovykh prats «Problemy suchasnoi psykholohii» [Collection of scientific issues "Problems of modern Psychology"]*, *53*, 284–305. Retrieved from https://doi.org/10.32626/2227-6246.2021-53.284-305

9. Khwaja, A. (2012). KDIGO clinical practice guidelines for acute kidney injury. *Nephron Clin Pract, 120*, 179–84.

10. Mykhalchuk, N., Pelekh, Yu., Kharchenko, Ye., Ivashkevych, Ed., Ivashkevych, Er., Prymachok, L., Hupavtseva, N. & Zukow, W. (2020). The empirical research of the professional reliability of 550 doctors during the COVID-19 pandemic in Ukraine (March-June, 2020). *Balneo Research Journal. 368, 11(3), September 2020,* 393–404. Retrieved from http://dx.doi.org/10.12680/balne.

11. Onufriieva, L., Chaikovska, O., Kobets, O., Pavelkiv, R. & Melnychuk, T. (2020). Social Intelligence as a Factor of Volunteer Activities by Future Medical Workers. *Journal of History Culture and Art Research, 9(1),* 84–95. Retrieved from http://dx.doi.org/10.7596/taksad.v9i1.2536.

12. Onufriieva, L. & Ivashkevych, Ed. (2021). The development of learner's autonomy by the way of the formation of social intelligence. *Zbirnyk naukovykh prats «Problemy suchasnoi psykholohii» [Collection of scientific issues "Problems of modern Psychology"], 51*, 9–32. Retrieved from https://doi.org/10.32626/2227-6246.2021-51.9-32

13. Rogovyk L.S. (2013). Shkala psykhomotornoi aktyvnosti *[Psychomotor activity scale].* Electronic resource. Retrieved from ecopsy.com.ua/data/zbirki/2003_01/ sb01_57.pdf.

14. Villar, J., Blanco, J. & del Campo, R. (2015). Spanish Initiative for Epidemiology, Stratification & Therapies for ARDS (SIESTA) Network. Assessment of PaO/FiO for stratification of patients with moderate and severe acute respiratory distress syndrome. *BMJ Open, 5 (3).* Retrieved from https://doi.org/10.1136/bmjopen-2014-006812.