SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

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确定高新技术产品开发阶段的价格

DETERMINING THE PRICE OF INNOVATIVE HIGH-TECH PRODUCTS AT THE STAGE OF ITS DEVELOPMENT

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抽象的。 文章展示了俄罗斯高科技综合体企业在国内经济现代化及其向创新发展转型中发挥的日益重要的作用。 事实证明，需要开发新的、有效的组织和经济机制及工具，以实现适合现代条件的研发成果的商业化。 提出通过确定科技产品开发阶段的价格来解决研发成本优化问题。

关键词：企业、创新、高科技综合体、研发成果商业化。

Abstract. *The article shows the growing role of enterprises of the Russian high-tech complex in the modernization of the domestic economy and the implementation of its transition to innovative development. The need to develop new and effective organizational and economic mechanisms and tools for the commercialization of R&D results that are adequate to modern conditions is substantiated. A solution to the problem of optimizing R&D costs is proposed by determining the price of scientific and technical products at the stage of their development.*

Keywords: *enterprises, innovations, high-tech complex, commercialization of R&D results.*

Introduction

At the present stage of socio-economic development of the world community, the dominant paradigm has become the use of high technologies, new scientific knowledge, and the introduction of innovations as leading factors in ensuring effective economic growth and national competitiveness. Developed Western countries took the path of creating a “new economy” in the early 1990s of the last century. About 10 years later, they were joined by a number of newly industrialized (South Korea, Taiwan, China) and developing countries (India, South Africa). The fundamental difference between the “new economy” and the traditional one is that

intangible assets, such as theoretical knowledge, scientific and technical developments, and, above all, innovation, become the determining factors of production.

The new order of social and economic relations in the modern economy has the following characteristics:

1) dynamics, which are characterized by a rapid increase in the pace of change in markets (there is a constant emergence of new players, more advanced technologies, products, etc., which are actively displacing old ones;

2) innovation, new business approaches and management methods, new developments and flexibility become the most important attributes of a successful business;

3) there is a qualitative development of mass production, which merges with specialization for the needs of each individual consumer;

4) scientific achievements and developments become the engine of other industries;

5) the development of network cooperation sharply reduces the importance of the distance between economic agents from the standpoint of managing them, which ensures the growth of decentralization, which is so necessary for flexible and specialized business;

6) the effective use of information and communication technologies is becoming a vital necessity for the competitiveness of both individual enterprises and the country as a whole.

Innovation activity in the world's leading economies

The economic essence of innovation lies in obtaining the final result of innovation activity, embodied in the form of a new or improved product (service) sold on the market, as well as a new or improved technological process used in practical activities [1]. In accordance with international methodological recommendations and standards (Oslo Manual, 2005), four main types of innovations are widely used abroad in public life - product, process, marketing and organizational, which determine their economic essence [2].

As world experience shows, effective innovation is possible if at least the following conditions are present:

- state support at the stages of R&D, formation of intellectual property objects (IPO) and creation of prototypes;

- creation of appropriate conditions and developed infrastructure for the practical implementation of innovations at the stage of R&D implementation;

- expansion of sources of financing innovative activities by attracting private investors at the stage of commercialization of R&D results.

However, the interests of private investors and the state when carrying out innovative activities do not always coincide. In most cases, the main goals of private entrepreneurs are the industrial development of R&D results with the launch

of new or improved products (services) on the market and increasing the capitalization of innovative enterprises created by them for the implementation of specific innovative projects. After reaching the peak of capitalization, the private investor seeks to sell his stake in the innovative enterprise and refocus on the implementation of a new innovative project. The goals of the state when implementing innovative projects are the introduction of new products to the market and their subsequent production, which contributes to the transition of production to a qualitatively higher level and increasing the competitiveness of domestic products in the domestic and international markets.

The initiative for the initial development of innovative industries in Western countries came from national governments concerned about strengthening their own defense capabilities. However, in contrast to the command economic system, the market model and comparative openness in developed countries made it possible for new technologies to flow smoothly into the private sector, where their further development took place. And now, by the beginning of the 21st century, investments from private companies have outstripped and many times exceeded budget expenditures.

The United States maintains a leading position in many indicators of the development of science and innovation. In 2019, they reached their historical maximum of spending on science - 3% of GDP. One of the main factors driving the growth of federal R&D funding in recent years has been the competitive struggle to maintain superiority in science and technology on the world stage. From 2000 to 2019, global U.S. R&D spending more than tripled in current dollars, from $677 billion to $2.2 trillion. However, the US share in these expenses decreased to 27% in 2019, with China taking second position (22%), followed by Japan (7%), Germany (6%) and South Korea (4%) [3].

According to the Organization for Economic Cooperation and Development (OECD) for 2019, the United States remains the leader in terms of R&D funding ($657 billion). According to the National Science Foundation for 2019, the structure of US R&D funding looks like this: out of a total investment of $657 billion:

- $463.7 billion (70.6%) came from business,
- $138.9 billion (21.2%) - from federal laboratories,
- $21.8 billion (3.3%) - from universities and colleges,
- $26.7 billion (4.1%) - from other non-profit organizations,
- $5 billion (0.8%) was sent by state and local governments [4].

China ranks second ($526 billion). It is constantly strengthening its position and is ahead of the top six world leaders in spending on science, such as Japan, Germany, South Korea and France combined. The 10 largest states funding R&D accounted for $1.863 trillion in 2019, which is about 84.7% of global spending on science. The 20 leading countries accounted for $2.078 trillion, or 94.5% of the global total [5].

The characteristic trend of science expenditures in global R&D expenditures in the period from 2000 to 2019 is Among the top 10 countries, six countries saw their share decline (USA, Japan, Germany, France, UK, and Italy), but four countries saw their share of spending increase (China, South Korea, Russia, and Taiwan). This indicates a shift in the global concentration of R&D from the developed countries of the USA and Europe to the countries of East, Southeast, and South Asia [6].

China has the highest rate of growth in R&D spending among major economies in the world. Its position has significantly strengthened in international patent activity and in knowledge-intensive and high-tech production. From 2000 to 2019 China's share of global R&D increased from 4.9 to 22%, while the US share fell from 39.8 to 27%, and Japan's share fell from 14.6 to 7%. In 2019, China's R&D increased by 13%, the highest among major economies in the world. China's innovation intensity rate almost tripled between 2000 and 2019 [7].

In addition, in actively developing countries, the state continues to actively support scientific activities by providing innovative enterprises with tax preferences and subsidies, low loans, grants, as well as through administrative measures.

Features of innovation development in Russia

The transition to an innovative path of development of Russian society predetermines the need to take into account the advanced achievements of scientific and technological progress in combination with the peculiarities of the development of the domestic economy. The basis of this approach is a continuous and targeted process of searching, preparing and practical implementation of product, technological, process and other innovations (innovations) that make it possible to increase the efficiency of the functioning of social production and the service sector, as well as the degree of realization of the ever-increasing needs of society. In order for the Russian Federation to take a significant place as one of the global leaders, it is necessary to achieve comparability of the technological base of the Russian economy with the leading countries of the modern world. In turn, innovation activity is one of the main drivers of economic growth in the Russian Federation [8].

In the Russian Federation, the volume of costs for innovation activities for 2010-2021. increased by 5.9 times and reached 2379.71 billion rubles. At the same time, in 2015 compared to 2014, there was a decrease in the indicator under consideration by 8.3 billion rubles. This is due to the financial crisis in 2014-2015, during which there was a deterioration in the overall economic situation in the country due to the introduction of economic sanctions. The largest increase in the amount of costs for the development of innovative activities of organizations occurred in 2019 compared to 2018 - by 481.3 billion rubles. (see Fig. 1 [9]).

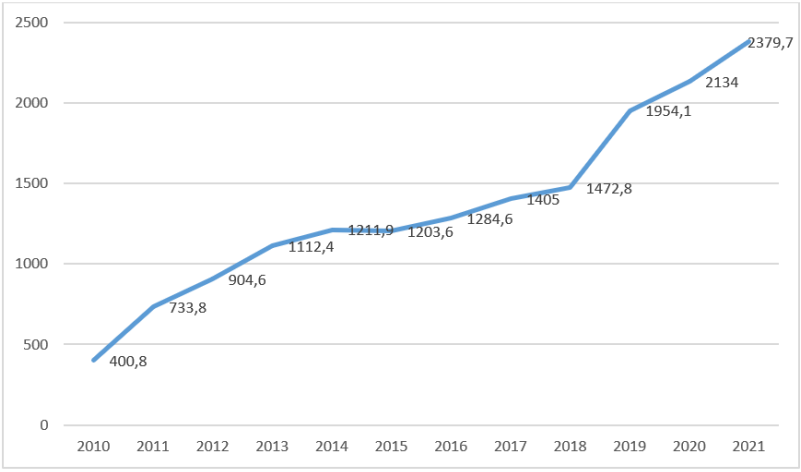

Figure 1. *Dynamics of costs for innovation activities in the Russian Federation (2010-2021), billion rubles*
Source: compiled by the authors based on Rosstat data [9].

The share of innovative production in most sectors of the economy is very small. Qualified scientific, engineering and technical personnel are not fully utilized. The production base of the domestic economy is dominated by technological equipment of outdated structures, and its renewal is proceeding at a very slow pace. The exception to this is the high-tech complex (HTC), as well as the information and communication technology (ICT) sector. It seems obvious that the success of modernization and the transition of the Russian economy to innovative development will largely depend on the effective functioning of the MTC and the ICT sector.

MTC plays an important role in the economy, as it contributes to the development of innovation, increasing productivity and competitiveness of the country. MTC enterprises are a key factor in the economic development of the country since their innovative activities contribute to productivity growth, increasing the competitiveness of products, creating new jobs, attracting additional funds and developing the export of high-tech products and services.

The main prerequisite for the innovative development of MTC enterprises should be the emergence of promising R&D results for commercialization, a significant increase in their quality, as well as the ability to compete in domestic and foreign markets. The process of commercialization of R&D results consists of introducing new or improved products (services) to the market using the rights to create them [1]. It is no secret that due to the imperfection of the system of intel-

lectual capital management and organizational and economic support for commercialization that has developed at domestic high-tech enterprises, many promising R&D projects are not brought to the stage of commercial implementation in both the domestic and foreign markets.

The way out of this situation is seen in the need to develop new and effective organizational and economic mechanisms and tools for the commercialization of R&D results that are adequate to modern conditions. To do this, it is necessary to solve many problems facing MTC enterprises. One of the most important among them is the problem of optimizing R&D costs. This problem determines the importance of the task of improving the methodology for calculating the costs of R&D or the price of scientific and technical products (STP) when concluding contracts for their creation.

Since STP is a specific type of product, it can be assumed that, provided that the list of tasks initially agreed upon in the terms of reference remains constant throughout the entire period of its creation, the price of STP will depend on the following factors:

- demand for scientific and technological progress (its value for potential consumers);
- level of coordination of work during the development of scientific and technical progress;
- degree of importance of the consumer (customer);
- expected level of inflation;
- the number of main tasks solved in the process of creating scientific and technical progress.

When determining the costs of R&D, it is also necessary to take into account the tendency for the technical means that are used in the development of scientific and technological progress to become more expensive over time.

To take into account the influence of the above factors when determining the costs of R&D and forming the price of scientific and technical progress, it is necessary to use the appropriate coefficients. Calculation of the expected costs of the STP customer should be made, from our point of view, according to the following formula:

$$C_{НТП}(t_н, t_{ок}) = C^{П}_{НТП}\left(t_p, t_н, t_{ок}, \overline{R}^{C}_{И}(t_н, t_{ок})\right) + \Delta C\left(t_н, t_{ок}, \overline{R}^{C}_{И}(t_н, t_{ок})\overline{R}^{Ф}_{И}(t_н, t_{ок})\right) \quad (1)$$

where: $t_н$ - planned date for the start of work on the creation of STP;

$t_{ок}$ - planned date for the start of work on the creation of STP;

t_p - calculated point in time;

$C^{П}_{НТП}\left(t_p, t_н, t_{ок}, \overline{R}^{C}_{И}(t_н, t_{ок})\right)$ - planned (preliminary) price of scientific and technological progress (in prices of the estimated time t_p), created by the contractor in the period ($t_н$,$t_{ок}$), with the inflation index agreed between the customer and the contractor for this period at the level $\overline{R}^{C}_{И}(t_н, t_{ок})$;

$\overline{R}_{И}^{C}(t_н, t_{ок})$ - the weighted average inflation index for the period ($t_н$,$t_{ок}$) agreed between the customer and the contractor, which corresponds to the preliminary price of scientific and technical progress;

$\overline{R}_{И}^{Ф}(t_н, t_{ок})$ - actual value of the weighted average inflation index during the period (tн,tок).

$\overline{R}_{И}^{Ф}(t_н, t_{ок})$ =1, if $t_н = t_{ок}$ or during the period ($t_н$,$t_{ок}$) prices do not change, or inflationary and deflationary processes balance each other at this time.

$\overline{R}_{И}^{Ф}(t_н, t_{ок})$ >1 if during the period ($t_н$,$t_{ок}$) there is an increase in the inflation index (the result of inflationary processes in the economy.

$\overline{R}_{И}^{Ф}(t_н, t_{ок})$<1 if during the period ($t_н$,$t_{ок}$) there is a fall in the inflation index (the result of deflationary processes in the economy);

$\Delta C\left(t_н, t_{ок}, \overline{R}_{И}^{C}(t_н, t_{ок})\overline{R}_{И}^{Ф}(t_н, t_{ок})\right)$ - the amount of adjustment of the planned (preliminary) price based on the results of the inflation index actually prevailing in the country during the period ($t_н$,$t_{ок}$).

Wherein:

$$\Delta C\left(t_н, t_{ок}, \overline{R}_{И}^{C}(t_н, t_{ок})\overline{R}_{И}^{Ф}(t_н, t_{ок})\right)=0, \text{ если } \overline{R}_{И}^{Ф}(t_н, t_{ок}) \quad \overline{R}_{И}^{C}(t_н, t_{ок}) \tag{2}$$

$$\Delta C\left(t_н, t_{ок}, \overline{R}_{И}^{C}(t_н, t_{ок})\overline{R}_{И}^{Ф}(t_н, t_{ок})\right) \quad 0 \text{ при } \overline{R}_{И}^{Ф}(t_н, t_{ок}) \quad \overline{R}_{И}^{C}(t_н, t_{ок}) \tag{3}$$

In this case, the value of the adjustment amount to the planned price is determined by the formula:

$$\Delta C\left(t_н, t_{ок}, \overline{R}_{И}^{C}(t_н, t_{ок})\overline{R}_{И}^{Ф}(t_н, t_{ок})\right)=C_{НТП}^{П}\left(t_р, t_н, t_{ок}, \overline{R}_{И}^{C}(t_н, t_{ок})\right)\left(\frac{\overline{R}_{И}^{Ф}(t_н,t_{ок})}{\overline{R}_{И}^{C}(t_н,t_{ок})}\right) \tag{4}$$

To obtain the value of the planned (preliminary) price of scientific and technological progress, it is advisable to use the concept of standard R&D - work on similar topics, for the implementation of which competitions were held in ministries and agencies of the Russian Federation. In this case, the data available in the catalog of R&D cost indicators can be used. The minimum price of R&D included in the same subclass with the planned R&D is taken as the base price.

The planned (preliminary) price of R&D should be determined by the formula:

$$C_{НИР}^{П}\left(t_р, t_н, t_{ок}, R_{ц}^{C}(t_н, t_{ок})\right) =$$
$$= C_{НИР}^{T}(t_б)\left(\rho_{mc}^{T}R_{mc}^{C}(t_б, t_р) + R_{ц}(t_б, t_р)(1-\rho_{mc}^{m})\right) \times \frac{R_{ц}}{R_{ц}^{m}} \times \frac{R_{\alpha}}{R_{\alpha}^{m}} \times \frac{R_{о}}{R_{о}^{m}} \times \frac{R_{з}}{R_{з}^{m}} \tag{5}$$

where: $C_{НИР}^{T}(t_б)$ - base price of typical R&D, calculated in point-in-time prices $t_б$;

$R_{mc}^{C}(t_б, t_р)$ - coefficient characterizing the degree of increase in the cost of technical equipment during the period ($t_н$,$t_{ок}$) acquired to carry out the planned R&D, compared with the cost of those funds that were purchased to carry out standard R&D;

ρ_{mc}^{m} - share of costs for the purchase of technical equipment in the price of standard R&D;

$t_б$ - the point in time in whose prices the price of standard R&D is calculated;

$R_{ц}$ - coefficient characterizing the value of scientific and technological progress;

$R_ц^m$ - coefficient characterizing the value of scientific and technological progress obtained during standard R&D;

R_α - coefficient characterizing the degree of importance of the customer for the planned R&D;

R_α^m - coefficient characterizing the degree of importance of the customer for typical R&D;

R_o - coefficient characterizing the role of the performer in organizing (coordinating) research and carrying out planned R&D;

R_o^m - coefficient characterizing the role of the performer in organizing (coordinating) research and performing standard R&D;

$R_з$ - coefficient characterizing the number of main tasks that require solutions in the process of performing planned R&D;

$R_з^m$ - coefficient characterizing the number of main tasks that were solved in the process of performing standard R&D.

In the case when the necessary initial data are not available to estimate the value of the coefficient $R_{mc}^C(t_б, t_p)$ the inflation index is used.

As initial information for determining values $\overline{R}_ц^C(t_б, t_p)$, $\overline{R}_p^Ф(t_н, t_{ок})$ $R_{mc}^C(t_б, t_p)$, $R_ц(t_б, t_p)$ It is advisable to use data published by the State Statistics Committee of Russia, as well as planned indicators of price changes adopted by the Government of the Russian Federation.

When only the annual inflation index is known, and the periods of creation of scientific and technological progress cover only part of the i-*th* year, then to estimate the inflation index it is necessary to use the formula:

$$R(t_j, t_{j+1}) = R_i^{\frac{m_i}{12}} \quad (6)$$

where: m_i - the number of months in the i-*th* year that belong to the period ($t_н$,t_{ok});

R_i - annual inflation index in the i-*th* year.

If the period (t_j,t_j+1) covers several years, then the inflation index should be determined by the formula:

$$R(t_j, t_{j+1}) = \prod_i R_i^{\frac{m_i}{12}} \quad (7)$$

The value of scientific and technological progress is determined by the level of novelty of the research that needs to be carried out to solve all the tasks set in the terms of reference and the level of quality of the results obtained. Therefore, the coefficient of value of scientific and technical progress is determined by the formula:

$$R_ц = R_ц^n \times R_ц^{K^p} \times R_ц^{K^{НИР}} \quad (8)$$

where: $R_ц^n$ - coefficient reflecting the level of novelty of scientific and technical progress;

$R_ц^{K^p}$ - coefficient reflecting the predicted level of quality of the results expected to be obtained during the development of scientific and technical progress;

$R_u^{K^{НИР}}$ - coefficient reflecting the a posteriori level of quality of results, determined based on the results of the planned R&D.

The values of the coefficient reflecting the level of novelty of scientific and technical progress vary from 1 (the work is aimed at clarifying individual results of a previously completed study) to 10 (the work is new, aimed at solving a newly emerging interdepartmental problem, developing the basic principles of theory and methodology).

The predicted level of research quality depends on the qualifications of R&D performers. An objective assessment of the qualifications of performers is whether they have academic degrees and academic titles. It is advisable to use these data as the basis for estimating the value of this coefficient based on the predicted quality of research results. The value of the coefficient, reflecting the a priori level of quality of the results, varies from 1 - work performed without the participation of candidates and doctors of science to 8 - work performed with the participation of doctors of science, professors (more than 10% of the number of performers). The value of the coefficient reflecting the a posteriori level of quality of the results is taken equal to one at the price negotiation stage. If any violations are detected on the part of the R&D contractor related to deviations from the tactical and technical specifications, the customer has the right to assign a value less than one to the coefficient reflecting the a posteriori level of quality of the results.

The values of the coefficient characterizing the role of the contractor in organizing (coordinating) research and performing planned R&D varies from 1 to 1.75, depending on the number of co-executors and their tasks.

Conclusion

As a result of the research, the following conclusions were formulated.

1. The active socio-economic growth of many countries is directly related to the development of science, education, development and implementation of innovative technologies and products that help meet consumer demand.

2. A characteristic trend in recent years has been a shift in the global concentration of R&D from the developed countries of the USA and Europe to the countries of East, Southeast and South Asia (China, South Korea, Taiwan), as well as to Russia.

3. In Russia for the period 2010-2021. There was also an increase in costs for innovation activities. MTC enterprises play an important role in the development of the Russian economy. They contribute significantly to the development of innovation, productivity and competitiveness. MTC enterprises are a key factor in economic development because their innovative activities ensure productivity growth, increase the competitiveness of products, create new jobs, attract additional funds and develop the export of high-tech products and services.

4. The model proposed by the authors formed the basis for the methodology for calculating the costs of R&D, the price of innovative high-tech products at the stage of their development, as well as determining the planned level of profitability of production for MTC enterprises. The application of this methodology contributed to increasing the efficiency of these enterprises. In addition, the proposed model was used in the development of methodological foundations for assessing the competitiveness of scientific and technological progress.

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引入情境控制来管理发展经济对象和系统
INTRODUCTION OF SITUATIONAL CONTROLLING TO MANAGE DEVELOPMENT ECONOMIC OBJECTS AND SYSTEMS

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抽象的。 在制裁限制条件下提高管理经济对象和系统发展的效率似乎是相关的。 选择治理机构促进经济目标和系统发展的活动作为研究对象。 研究的主题是态势管理信息系统。 研究的目的是证实需要将态势管理信息系统引入经济对象和系统的活动中，并在其组成中包括态势控制子系统。 所提出方法的实际实施将提高经济对象和系统的效率。

关键词：经济对象和系统、发展、管理、信息系统、态势控制。

Abstract. *Increasing the efficiency of managing the development of economic objects and systems under the conditions of sanctions restrictions seems relevant. The activities of governing bodies for the development of economic objects and systems were chosen as the object of study. The subject of the study is the situational management information system. The purpose of the study is to substantiate the need to introduce a situational management information system into the activities of economic objects and systems and include a situational controlling subsystem in its composition. The practical implementation of the proposed approaches will improve the efficiency of economic objects and systems.*

Keywords: *economic objects and systems, development, management, information system, situational controlling.*

Introduction

Despite the fact that the concept of situational management is a relatively new area of economic science, today it is actively developing and is widely used at different levels of management. This concept is intended to substantiate management decisions in relation to the functioning of complex economic objects and systems in market conditions. It is based on the principles of situational controlling with

the inclusion of procedures for goal setting and managing the process of achieving them. According to the authors, the application of the concept of situational management most fully satisfies the requirements and promising directions for the development and implementation of strategic programs for the development of economic objects and systems.

Purpose of the study

The purpose of the study is to substantiate the need to introduce a situational management information system into the activities of economic objects and systems and include a situational controlling subsystem in its composition.

Materials and methods

Traditional approaches to managing the development of economic objects and systems were based on the principles of formalization and simplification. Of course, with a decrease in the number of parameters, it is much easier to control an object or system. Many control technologies that until recently seemed modern were formed based on the principle of minimizing parameters. But today in management the role of the influence of environmental factors on the object of management has increased significantly. This circumstance is recognized by most economists [1, 3].

With the growing volumes of processed information and the need to take into account an increasing number of factors of external influence on the development of economic objects and systems, the complexity of analyzing and modeling their management increases. Therefore, in modern conditions, new approaches are needed to formalize the impact of environmental factors on the control object. But, as practice shows, the influence of environmental factors on an object most often cannot be predicted in advance [2, 6]. At the same time, it can be considered fair to say that the control object is not influenced by the entire environment, but only by those factors that can be formalized as an information situation. The need to take into account the influence of such a situation on the control object, its condition and development dynamics led to the introduction of the concept of situational management [4, 7].

In theoretical terms, situational management is used as an alternative to planned management. It allows you to manage the development of economic objects and systems under unforeseen circumstances and/or in emergency situations (abnormal situation management, ASM) [8]. Approaches to situational management of emergency situations are closely related to competitive decision-making factors, such as capital investments, technological risks, the domestic market and its infrastructure, the political environment, and strategies for the development of economic objects and systems [5].

Situational management can be defined as a system of concepts, models and rules for interpreting, analyzing and predicting the development of the state of a

control object. Such situations exist in dynamic systems for managing the development of economic objects and systems during predetermined time intervals [5]. To manage situations, multi-agent systems, correlative analysis, metaheuristics, situational management information systems, etc. are used. In this article we will consider an approach to the use of information systems for situational management of the development of economic objects and systems.

Results and discussion

In theoretical terms, the basis for the formation of an information system for situational management (ISSM) of the development process of economic objects and systems is based on a hypothesis that assumes that all economic information necessary for management, previously used in an unstructured form, can be structured on the basis of a special image. Bottoms and generalizations using formalization procedures in specific areas of regional management. The central element of such a system is the situation that determines the current state of the control object, taking into account the impact of environmental factors on it, and also provides for the dynamics of their change over time. At the same time, it is important to observe the need and possibility of representing in time the target or required states of the control object and the corresponding expected states of environmental factors. In other words, each specific state of the environment (current state of the market) must correspond to the required (target) state of the control object.

It seems obvious that in economic situational control systems, the current and target situations in which the control object is located under the influence of environmental factors must differ. In the general case, these situations are determined by a certain set of economic indicators that characterize the state of the control object in relation to a specific situation. The difference between the indicators of an acceptable typical (generalized) current situation and a typical target situation will be called the reference situation of the control object. This makes it possible to match each reference situation with certain management activities. Carrying out these activities allows you to eliminate the differences between the current and target problem situations of the control object under given or previously known environmental conditions.

The above circumstances make it possible to define a model of situational management of the development of economic objects and systems by the following components:

1) a set of target situations, determined by a set of economic indicators and reflecting a discrete process of changing the state of the regional economy in continuous time with a given (planned) course of its development process;

2) current and reference states of the environment, which can accompany, respectively, the actual and planned states of development of the regional economy;

3) a set of reference situations and corresponding environmental states that arise regardless of the control object, but have a significant impact on it.

In this case, each pair “reference situation - state of the environment” is associated with certain organizational and managerial measures, which, under given environmental conditions, make it possible to achieve the required state of the control object, determined by the program of its strategic development. To reduce the total number of target, current and reference situations, when describing them, it is proposed to use the apparatus of fuzzy sets, which allows for a generalized representation of various situations in terms of natural language.

In its structural design, the information system for situational management of the development of economic objects and systems in the most general case can be presented in the form of a diagram shown in Figure 1.

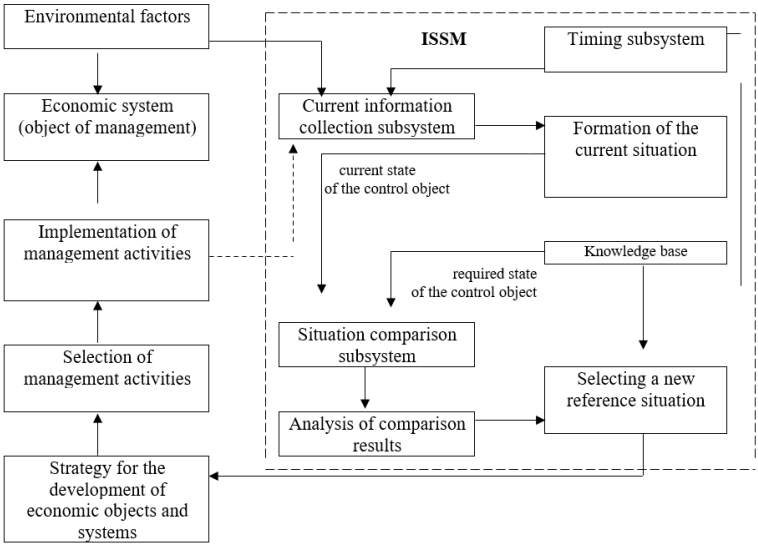

Figure 1. *Situational management information system of development of economic objects and systems.*

The information system for situational management of the development of economic objects and systems functions as follows. In the Time Counting Subsystem, after the planned period of time has elapsed, a control signal is generated. When it appears in the *Current Information Collection Subsystem*, primary processing of data is performed that determines:

- current (actual) state of the control object;
- the state of the process of economic development of economic objects and systems (consumer demand, resource and production capabilities of enterprises, their financial, technical and technological state of the enterprise, etc.);

- the current state of environmental factors (inflation level, interest rate of banks, level of competition, investment rating of economic objects and systems, etc.).

Based on the information received, the current situation is formed, which determines the actual state of the control object and the nature of the impact of environmental factors. Next, the situation formed in this way is submitted to the *Situation Comparison Subsystem*. At the same time, the required (target) state of the control object at a given moment in time is supplied to the same subsystem from the knowledge base. After this, all differences between the actual and required situations of the control object are determined. If there are no differences, then the process of functioning of the control object proceeds as planned. Otherwise, the pair *"Indicators of differences between the current and reference states of the control object" - "Characteristics of the impact of environmental factors"* is formed. Based on the resulting pair, the reference situation closest to it in content is identified in the knowledge base. In accordance with this situation, a set of necessary organizational and managerial measures is determined, the implementation of which will eliminate the identified differences between the actual and required state of the control object. To check the feasibility of the selected activities, the mathematical apparatus of queuing theory can be used. The results of the check in the form of the newly received current state of the control object are transmitted to the *information collection subsystem* (the transmission connection and its direction are shown in Fig. 1 with a dotted line). If the newly obtained situation shows that the selected measures allow one to get closer to achieving the given goal, then these organizational and managerial measures are implemented directly at the control object.

After completing the selected activities, the information system moves on to the next management cycle, implemented according to the principle described above, etc., until a satisfactory result is obtained, i.e. until there is no difference between the actual situation and the required one.

Further development of the information system for situational management of the development of economic objects and systems is associated with the implementation of the *Situational Controlling Subsystem*. This *subsystem* takes into account the specific operating conditions of economic objects and systems in commodity markets, as well as environmental factors and the nature of their impact on the management object. It allows you to implement financial and economic management functions that ensure the adoption of operational and strategic management decisions. Situational controlling, along with other latest management tools, helps the management of economic entities and systems to ensure accelerated progress in the development of all areas of their activities.

In general, situational controlling should be understood as a functionally separate direction of the economic work of management bodies of economic objects

and systems. It is associated with the implementation of the financial and economic management function in the form of a situation for making operational and strategic decisions and issuing recommendations that determine the reasons for changes in the analyzed situations and aimed at eliminating them.

The main goal of situational controlling is to orient the management process towards achieving all the goals facing the management object by using previously accumulated experience of functioning in various situations of a problematic environment. At the same time, its main functions are:

1) regulation of the activities of the management apparatus to achieve the goals of economic objects and systems in accordance with external and internal operating conditions;

2) information and intellectual support for making management decisions;

3) creation and ensuring the functioning of a general information system for managing the development of economic objects and systems based on a knowledge base;

4) ensuring the optimality and rationality of the management process.

Thus, the basic concept of situational controlling includes procedures for defining goals and managing their achievement.

The formation of the *Situational Controlling Subsystem* is based on the further development of the automated control system by the development of economic objects and systems, which should reflect in a formalized form all existing experience in monitoring and managing their activities. To implement this approach, it is necessary to develop and include in the automated control system many rules for the formation of logical conclusions, having the following structure: "the current state of the external and internal environment of the business entity the reasons for the occurrence of deviations of the actual values of the parameters from the planned ones."

At the same time, the *Situational Controlling Subsystem* clearly defines the goals of economic development of the management object, management principles and methods of their implementation. Occupying a special place in the automated control system, the *Situational Controlling Subsystem* will provide information support for decision-making in order to optimally use existing opportunities, and realistically assess the strengths and weaknesses of the activities of economic objects and systems.

It should be noted that the need to implement the *Situational Controlling Subsystem* in the Information Management System for the development of economic objects and systems today is becoming an objective need. Most economic entities and systems experience difficulties in selling their products both on the foreign and domestic markets. Market prices for various types of equipment, materials, and rental premises usually grow faster than prices for already produced prod-

ucts. This leads to a decrease in the profits of economic objects and systems when selling their products, which entails the need for a detailed analysis of the market and the importance of solving the problem - what, where, from whom and at what price to buy. All this creates additional prerequisites for the implementation of the *Situational Controlling Subsystem*, which allows you to find the most optimal course of action, maintain and increase the market share of regional products, and achieve maximum profits for business entities.

The introduction of a situational controlling subsystem is actually an innovation. Its widespread use at the regional level is necessary for the following reasons:

1) the use of situational controlling is an extremely effective method of market management, which requires minor adaptation to the specific conditions of the activity of economic objects and systems;

2) analysis of emerging problems in managing the development of economic objects and systems, their trends and experience in eliminating them is important for a timely assessment of emerging difficulties and finding ways to overcome them;

3) the introduction of a situational controlling subsystem will allow the prompt application of the most modern management methods, since the main thing in controlling is the implementation today of what will be used only tomorrow, relying on previously accumulated operational experience, which allows us to determine trends in further economic development;

4) in the practical implementation of situational controlling procedures, all its components (accounting, analysis, planning, control, marketing, information) and their deep knowledge, a reasonable combination and interrelation of which ensures high efficiency in the development of economic objects and systems;

5) situational controlling is aimed at the future, therefore it is one of the foundations of strategic management of the development of economic objects and systems;

6) using the accumulated management experience, situational controlling actively promotes the constant improvement of the qualifications of all employees of management bodies for the development of economic objects and systems.

However, for the successful application of situational control in modern Russian conditions, it is necessary to solve the following main problems.

Firstly, for the actual implementation of situational controlling, it is necessary to rebuild the accounting, planning and analysis system used both at the regional level and at the level of individual enterprises.

Secondly, when switching to a situational controlling system, an important requirement is the use of management accounting as the basis for the accounting policy of all business entities. To do this, it is necessary not only to divide costs into fixed and variable, to identify profit volumes, but also to take into account

costs and sales results both by type of product, service, and by market segments, customer groups, and places where production and financial results are formed.

The widespread introduction of situational controlling allows the use of the most modern management methods in competition and promotes innovation. The simultaneous introduction of the *Situational Controlling Subsystem* into the activities of management bodies of economic objects and systems will allow solving the following problems:

- overcome the inconsistency of management decisions in relation to different levels of management;
- improve the organization of management of the development of economic objects and systems by applying best practices and the latest management principles;
- improve coordination of the activities of management bodies of economic objects and systems;
- rationally combine management influences at all levels of management;
- solve a lot of specific problems of managing the development of economic objects and systems;
- development of progressive schemes and methods of connecting science with the activities of economic objects and systems.

Conclusion.

The results obtained during the research allow us to draw the following conclusions.

1. The introduction of modern information management systems for the development of economic objects and systems is an objective necessity for solving complex management problems in difficult to predict situations.

2. With information influence, the information situation acts as a shell in relation to the control object. This approach allows you to reduce the information load on the control object. Practice shows that in some cases it is quite enough to control the situation, and not the object itself.

3. The use of information management systems for the development of economic objects and systems opens up the possibility of implementing flexible management, which makes their activities more sustainable compared to deterministic management.

4. ISSM make it possible to differentiate the management resources of economic objects and systems in relation to specific information situations. This improves resource efficiency.

5. The introduction of the *Situational Controlling Subsystem* within the framework of the Information Management System will have a positive impact not only on the development of economic objects and systems, but will also allow them to promptly respond to market changes, act on it, constantly focusing on the future,

determine the prospects for their development through effective planning with direct and feedback, achieve high financial results and not be afraid for your future.

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论残疾儿童体育教育在包容性背景下的作用
ON THE ROLE OF PHYSICAL EDUCATION OF CHILDREN WITH DISABILITIES IN THE CONTEXT OF INCLUSION

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注解。 本文介绍了基于使用游戏方法的包容条件下学龄前残疾儿童体育教育计划有效性的研究结果。 对教师和家长意见的社会学研究结果表明，在包容性学前教育领域需要采取有效的策略。 普通学前班家长（61.5%）表示，残疾儿童比健康儿童受到的保护较少（$p<0.05$）。 儿童体育实验项目旨在通过参与允许的休闲形式来提高每个孩子的运动活动、发展沟通能力和创造力，已证实其有效性。

关键词：学龄前儿童、包容性、体育教育、残疾。

Annotation. *This article presents the results of a study of the effectiveness of a physical education program for preschool children with disabilities in conditions of inclusion based on usage gaming methods. The results of a sociological study of the opinions of teachers and parents indicated the need for effective strategies in the field of inclusive preschool education. According to parents (61.5%) in regular preschool groups, children with disabilities are less protected than healthy children ($p<0.05$). Experimental program physical education of children, aimed at increasing motor activity and development communication and creative abilities of each child through participation in permitted forms of leisure has confirmed its effectiveness.*

Keywords: *preschool children, inclusion, physical education, disabilities.*

Relevance of this study is determined by the need to develop physical education programs for children with disabilities, the number of which currently stands at more than 1.6 million and is growing. Adapted sports activities help develop physical activity, strength, coordination and flexibility, and social skills [12].

Physical education is included in the structure of adaptive physical culture. The correct organization of adaptive physical education is achieved through the implementation of educational, developmental, health, correctional and educational tasks [1].

Sports can be adapted for different children depending on their individual needs and capabilities. For example, there are special programs for children with musculoskeletal disorders, for children with autism, visual or hearing impairments, etc. These programs are developed taking into account the characteristics of each group of children and their specific needs [3].

Purpose of this study was to study the effectiveness of a physical education program for preschool children with disabilities in conditions of inclusion.

Object of study is the process of physical education of preschool children with disabilities in conditions of inclusion.

Subject of study is the effectiveness of using game methods in an inclusive preschool educational organization in the physical education of children with disabilities.

Empirical basis of the study is a municipal budgetary preschool educational institution “Kindergarten of compensatory type No. 19 “Zvezdochka” in Almetyevsk.

The preschool educational institution operates according to the program FAEP PE is a federal adapted educational program of preschool education for students with health limits (HL), compiled on the basis of FOP PE (federal educational program of preschool education), taking into account developmental disorders of a child with disabilities.

The kindergarten is funded by the municipal government; it educates 108 children, including 1 child with a mild form of cerebral palsy, 1 child with congenital deformation of the upper limbs, 1 child with blindness in one eye, 3 children with early childhood autism and 2 children with hearing problems .

Material and methods. The research included solving the following problems:

- study of the opinions of teachers, parents, children about the effectiveness of the physical education program using the example of kindergarten No. 19”Star”;
- quantitative and qualitative analysis of the results of an empirical study of the physical development of children with disabilities;
- development of practical recommendations for improving physical educationchildren with disabilities in conditions of inclusion.

The study involved 32 children attending an inclusive kindergarten. The project participants were divided into 2 groups: control and experimental.

Research results. In a sociological study conducted on the basis of a questionnaire, the following questions were studied (Table No. 1).

Table 1.

Contents of questionnaires to study the effectiveness of the physical education program

For teachers	For parents	For children with disabilities
1. Rate the availability of methods and materials for working with children with disabilities (using a 5-point system). 2. What is the level of support and cooperation from your manager and colleagues? 3. How do you evaluate the effectiveness of your work with children with disabilities (using a 5-point system)? 4. Is there a need for additional training activities to improve skills?	1. How do you assess the availability of services and programs for your child (using a 5-point system)? 2. Rate the effectiveness of the work of teachers and psychologists with your child (using a 5-point system). 3. What is the level of awareness of the educational institution about the needs of your child (according to a 5-point system)? 4. Is there a need for additional services or programs for your child?	1. Do you like studying in kindergarten with teachers? 2. What do you like most about kindergarten? 3. What don't you like about kindergarten and what can be improved?

Results were obtained indicating that:

1. The majority of teachers surveyed (60.0%) believe that adapted curricula and individual plans are necessary for working with children with disabilities. This is important for implementing a more flexible and individualized approach to the education of children with disabilities, as well as for social integration and interaction with other children. This indicates that there is potential to develop an education program that takes into account the diverse needs of children and provides them with opportunities to develop and grow in an inclusive environment.

2. Data from a survey of parents showed that they have different experiences in raising children with disabilities: from beginners to experienced parents. Accordingly, respondents assess the availability of services and programs for children differently. The level of awareness of educational institutions about the needs of each child is ambiguously assessed. According to parents (61.5%) in regular preschool groups, children with disabilities are less protected than healthy children($p<0.05$). This confirms that there is a need for further training and support for educators to be able to work effectively with children with different learning needs.

3. The answers of children with disabilities to the questionnaire were less informative, but in general demonstrated satisfaction with visiting this kindergarten.

Effectiveness study results physical education programs are presented in table No. 2.Regular training and a gradual increase in the complexity of tasks help develop accuracy, coordination, speed and strength in children with disabilities, which is clearly visible when performing basic types of cyclic and acyclic movements.

To the pilot program physical education of children included mobile games that are a fun form of activity. This is a valuable tool physical education, which helps strengthen muscles, develop endurance, motor skills and coordination, improve blood circulation and breathing, increase metabolism and develop social skills.

Table 2.

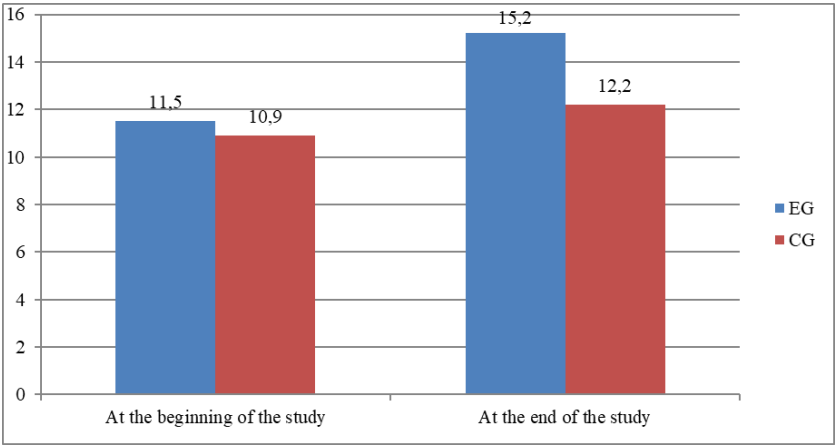
Results of changes in performance indicators of the main types of movements (%)

Types of movements	Control group (CG)	Experimental group (EG)
Throwing	52.1	61.3
Run	31.4	54.8
Bounce	12.3	25.2
Walking	70.7	90.6

The program developed and implemented within the framework of this experiment was also aimed at creating a value basis for the personal well-being of children and ensuring physical activity, as well as developing the communicative and creative abilities of each child through participation in permitted forms of leisure.

The essence of the program is that each child has tasks that are marked on a calendar or chart. They can be related to sports (blue marks), creativity (red marks) or organization (green marks). Each day, a child can only submit one entry per color (maximum of three entries per day). Depending on the number of applications, the child may receive the highest rank. When a new status is achieved, the child is awarded a ribbon of a certain color.

In Fig. 1. The results of the test task “Raising the body from a position lying on your back in 30 seconds” (number of times) are presented. In the experimental group, indicators improved by an average of 3.7 lifts, and in the control group - by 1.3 lifts ($p<0.05$).



Rice 1. *Results of the test "Raising the body from a position lying on your back in 30 seconds" (number of times)*

Discussion. In an inclusive preschool educational organization, it is effective to use game methods in the physical education of children with disabilities. Early intervention in an inclusive kindergarten setting and adapted sports activities play an important role in supporting the development of children with disabilities and realizing their potential. They help children overcome difficulties and become active, independent members of the team.

Conclusion. The data obtained indicate that an adapted physical education program is needed in trinity with teachers, parents and children with disabilities. Based on the results obtained, practical recommendations were developed to improve physical education children with disabilities in conditions of inclusion.

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研究卢甘斯克人民共和国 1-4 年级学生体育教育区域组成部分的方法论

METHODOLOGICAL APPROACHES TO THE STUDY OF THE REGIONAL COMPONENT OF PHYSICAL EDUCATION OF STUDENTS IN GRADES 1-4 OF THE LUGANSK PEOPLE'S REPUBLIC

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注解。 在 T.T. Rothers 和 N.A. Pavlova 的文章“卢甘斯克人民共和国 1-4 年级学生体育教育区域组成部分的研究方法论”中，定义了健康保护、价值论、文化等方面的方法论基础。 ，系统的，个人活动和基于能力的方法作为确定体育教育区域组成部分的理论前提，旨在形成健康价值观，健康的生活方式，和谐的精神和身体发展，其中主导地位是相互作用 体育和美育，以及学生健康人格的发展。

关键词：区域组成部分、体育教育、卢甘斯克人民共和国、方法论、健康、健康生活方式、能力、文化、体育文化、价值观。

Annotation. *In the article by T.T. Rothers and N.A. Pavlova "Methodological approaches to the study of the regional component of physical education of students in grades 1-4 of the Lugansk People's Republic" defines the methodological foundations in the aggregate of health-preserving, axiological, cultural, systemic, personal-activity and competency-based approaches as theoretical prerequisites for identifying the regional component of physical education aimed at the formation values of health, a healthy lifestyle, harmonious spiritual and physical development, where the dominant position is the interaction of physical and aesthetic education, and in general, the development of a healthy personality of students.*

Keywords: *regional component, physical education, Lugansk People's Republic, methodological approaches, health, healthy lifestyle, competencies, culture, physical culture, values.*

The relevance of the problem of studying the regional component of physical education of students in the Lugansk People's Republic in accordance with the

requirements of the Federal State Educational Standard of Primary General Education is due to the existing social and political transformations in the Donbass, the deterioration of the physical and mental health of schoolchildren, which actualizes the need to substantiate the theoretical and methodological foundations of physical education of students 1-4 grades.

Analysis of the Federal State Educational Standard for Primary General Education [8] indicates the direction of the requirements regarding the personal development of students, including spiritual, moral and sociocultural development. The position of personal results formed into a system of value relations of students towards themselves, other participants in the educational process, the educational process itself and its results is highlighted. Regarding physical education, its mission is focused on the level of creating a healthy lifestyle and providing conditions for maintaining and strengthening health. We note that the working educational program, in accordance with the requirements of the Federal State Educational Standard of Primary General Education, should be aimed at personal development, including spiritual and moral development, strengthening mental health and physical education, and achieving results in mastering the program. It should include familiarization with traditional spiritual values and be implemented in the unity of classroom and extracurricular activities.

The regional component of educational standards [7] should be considered as a complement and expansion of the federal component of educational standards in physical education. Its main goal is to provide an opportunity for participants in the educational process to expand the cognitive and motor capabilities of students through various forms of physical exercise, the most appropriate and effective, based on geographical, weather conditions, the state of the material base, the qualifications of teachers, the physical development and level of health of students in the Lugansk People's Republic.

It has been established that the regional component of physical education is a comprehensive correlation of education, upbringing and development in the school education system of the Lugansk People's Republic, as a new subject of the Russian Federation, its historical, cultural, socio-political, geographical and economic resources, which involves recognition of the individuality and self-worth of each student, based on taking into account the crises of ontogenesis, developmental psychology and physiology, on the construction of subject-object relationships that recognize the requirements of the humanistic concept of education - pedagogical support and independence.

The basis for determining the author's vision of the regional component of physical education for students in grades 1-4 of the Lugansk People's Republic is the methodological basis of research in the aggregate of health-preserving, axiological, cultural, personal-activity, competency-based approaches as the basis for studying and transforming the theory and practice of physical education.

As a result of the study, we found that at the conceptual level, we represent physical education of schoolchildren as a process of managing physical development, physical training and physical health, aimed at creating value systems for physical education classes, both in class and extracurricular forms.

For our research, the specific essence of the concept "Physical education of schoolchildren" is a shift in emphasis towards increasing the emotional background of classes, improving health, developing the rhythm of motor actions, where the dominant position is occupied by beauty in the aspect of interaction between physical education and aesthetic education. Health and a healthy lifestyle are important indicators of the regional component of physical education in the Lugansk People's Republic; therefore, the methodological basis for the formation of health and a healthy lifestyle is a health-saving approach that targets students on health-saving activities [3].

The methodological essence of the health-saving approach in the conditions of the Lugansk People's Republic is to determine the theoretical prerequisites for the implementation of the regional component of physical education from the standpoint of the value of physical and mental health, to determine the substantive and procedural characteristics of the entire primary education system, where the key figure is a healthy personality and the creation of conditions for the preservation and health promotion, motivation for a healthy lifestyle. The first place goes to the introduction of health-saving technologies, the use of innovative and non-traditional means of physical education as an asset for classroom and extracurricular activities of students in grades 1-4.

Axiological approach creates the basis for the formation of a value system for physical education classes for students of various age groups. In turn, the value system can dictate the goals, intentions and actions of both individuals and entire social institutions to achieve a high level of health through the system of physical education. Health as a value at the level of individual and social consciousness is considered as a desirable, ideal option, as a prerequisite and condition for a normal and fulfilling life, as a factor that opens or limits life prospects and achievements, as a condition for optimizing human existence.

V.A. Ananyev, emphasizing the value of health, considers it as the optimal prerequisite for a person to achieve his intended goals and objectives, which is the basis for understanding and realizing the meaning of life [1]. Consequently, the axiological approach acts as a kind of modern promising strategy for studying the regional component of physical education of students in grades 1-4 of the Lugansk People's Republic.

Cultural approach (E.V. Bondarevskaya, V.S. Bibler, I.S. Kon, B.T. Likhachev, A.V. Mudrik, N.D. Nikandrov, V.A. Slastenin, N.E. Shchurkova, etc.) makes it possible to consider physical education through the prism of culture, that

is, its understanding as a cultural process carried out in a culturally appropriate educational environment, all components of which are filled with human meanings and serve a person who freely expresses his individuality, the ability for cultural self-development and self-determination in the world of cultural values [9].

It is the cultural approach that characterizes the formation of the spiritual, moral and ethical culture of the individual from the point of view of the modern understanding of the humanistic ideal, which is important in the formation of personal physical culture in accordance with the existing model of improving the physical education of schoolchildren [2].

The content of the physical culture of students' personalities can include the ideas of self-development, self-improvement and conscious work on creating the image of a physically perfect person.

The spiritual culture of schoolchildren embodies its real image and is determined by the subject-integrative essence, objectivity as a set of values-goals, objectivity as a complex of values-means and values-qualities of the individual necessary for the formation of motivation in students to improve health, values of health culture and body culture.

The cultural approach to the study of the regional component creates theoretical prerequisites for the formation of physical education among schoolchildren. Based on personality-oriented health technologies, the educational process is aimed, first of all, at the development of new personal formations, spiritual and moral values, the disclosure of the existing spiritual and moral potential of the individual by including it in self-knowledge and self-development in the subjective cognitive motor activity of the educational process.

The basis of the general scientific level of the methodology for studying the regional component of physical education is a systematic approach, which allows us to consider physical education as a multifaceted and multi-level system in which all components of educational and extracurricular activities are closely interconnected [5].

Reliance on the basic principles of the systems approach, such as integrity, hierarchical structure, structuring, multiplicity, allowed the study to consider the process of physical education as an integral system. All components of the physical education system (worldview, theoretical and methodological, programmatic and normative, organizational) are considered not in isolation from each other, but in close relationship with each other.

Personal-activity approach is a process of human activity aimed at the formation of his consciousness and his personality as a whole. In the conditions of the personal-activity approach, the personality of students acts as an active creative principle. It is through activity and in the process of activity that self-development and self-actualization of the personality of schoolchildren occurs [4].

We note that the personal-activity approach is the methodological basis for the content of an approximate work program in physical education for various age groups. It is he who is evidence that at the center of the educational process in physical education is the student's personality, taking into account his interests, motives, value orientations in the field of his physical development and physical training, and on this basis the choice of individual programs of physical education activities.

Education in physical education lessons is activity-based in nature, the emphasis is on learning through practice, productive work of students in small groups, building individual educational trajectories, using interdisciplinary connections, developing students' independence and personal responsibility for decision making.

The implementation of the capabilities of the Federal State Educational Standard for Primary General Education in the Lugansk People's Republic is focused on a competency-based approach that defines the requirements for the results of mastering basic educational programs in physical education [6]. It is the competency-based approach that allows us to determine the specifics of the practice-oriented pedagogical process in physical education in the regional aspect.

To do this, schoolchildren need not only to have a body of knowledge, skills and abilities, but also a number of personal and physical qualities, to be able to assimilate new knowledge and increase the potential of motor experience, to be ready for its implementation in various types of physical education and sports activities.

Competencies are expressed in the degree to which a person demonstrates acquired knowledge, skills, behavioral attitudes in a changing situation to solve various problems, the formation of internal motivation, psychological and practical readiness to achieve higher quality results in social life and in personal physical culture.

The competency-based approach to physical training of students in general education institutions is one of the tools for modernizing the physical education of Donbass schoolchildren. The introduction of a competency-based approach to the educational process in physical education requires serious changes in the content of education, in the implementation of the educational process, and in the work practice of physical education teachers, where the key position is occupied by health promotion based on health-saving activities.

Thus, at the methodological level, the combination of valeological and health-preserving factors is important for our research. axiological, cultural, systemic, personal-activity and competency-based approaches, which makes it possible to orient the regional component of physical education of students in grades 1-4 of the Lugansk People's Republic towards harmonious spiritual and physical

development, where the dominant position is the interaction of physical and aesthetic education, the formation of body culture, culture movements and, in general, personal physical culture based on the values of physical exercise and the desire to achieve physical improvement.

The introduction of a regional component of physical education into the educational process of educational institutions of the Lugansk People's Republic will make it possible to implement mechanisms for preserving and strengthening health and developing the personality of students; to create motivation among students to engage in physical education and sports; increase the level of physical and mental performance, taking into account the individual typological and age-related characteristics of students' development; control the process of adaptation of primary school students to living conditions in the Lugansk People's Republic.

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高等院校学生课外活动中的健康文化
HEALTH CULTURE OF STUDENTS IN EXTRACURRICULAR ACTIVITIES IN HIGHER EDUCATIONAL INSTITUTIONS

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注解。 形成学生健康的生活方式是一个紧迫的现代问题。 健康作为一种工具价值的重要性日益增加。 健康研究和学生健康文化的形成强调理论方面。 已经确定了影响学生健康生活方式的主要因素。 笔者认为，教育环境对于保证学生的健康起着很大的作用。 提供了使用问卷调查方法对学生进行的调查材料。

关键词：健康、体育、健康文化、学生。

Annotation. *Forming a healthy lifestyle for students is a pressing modern problem. There is an increase in the importance of health as an instrumental value. Theoretical aspects are highlighted in the study of health and the formation of a culture of health among students. The main factors influencing a healthy lifestyle among students have been identified. According to the author, the educational environment plays a great role in ensuring the health of students. Materials from a survey of students using the questionnaire method are presented.*

Keywords: *health, physical culture, health culture, student.*

The main role in maintaining and strengthening health is played by the person himself. His lifestyle, attitudes, values and harmony of the inner world with others are the primary factors. A culture of health can only be achieved through one's own efforts and willpower. Willpower is the ability to control yourself and overcome obstacles on the way to your goals, as well as organize your activities and focus on specific tasks.[5].

Currently, strengthening and maintaining health has become one of the most important problems in various scientific fields, such as medicine, psychology and

pedagogy. A particularly vulnerable group of the population here is students who attend higher education institutions. Their daily lives revolve around learning and they spend most of their time in learning environments, which makes them especially susceptible to illness.

This significantly affects the physical development of students and leads to a deterioration in their health. Lack of physical activity reduces the body's functional capabilities. To prevent the development of this negative trend, it is not enough to effectively organize lesson forms of organizing physical culture and sports in a higher educational institution, but it is necessary to instill in students the culture and traditions of developing a healthy lifestyle in everyday life [5].

Due to the influence of many negative social factors and a sedentary lifestyle, the health of the population, especially students and student youth, is deteriorating sharply. A significant negative impact on the health of young people is caused by a decrease in physical activity, hypokinesia, physical inactivity and the lack of optimal daily physical activity.

An important area of activity of modern higher educational institutions is the search for new forms and methods of strengthening the health of students in the process of their training and education, both during academic and extracurricular time. One of these forms is the introduction of health-saving technologies into the educational process, aimed at increasing the conscious attitude of students to their health and the formation of physical education during extracurricular time.

In this regard, the purpose of this article is to reveal the essence of the process of forming a culture of health in students' extracurricular time and the psychological aspects of motivation, encouraging students to engage in physical education and sports, conducting a survey of students using a questionnaire. The problem of physical culture of students' health can be solved provided that an appropriate commitment to a healthy lifestyle is formed. The foundations are determined by knowledge, beliefs, needs and interests, the combined impact of which contributes to the formation of a culture of health.

Analysis of the latest research and publications. The analysis of scientific literature (research by K. B. Tsakaev, K. A. Babiyants, L. V. Zakharova, Y. P. Kobyakov, D. G. Radchenko, etc.) revealed that the formation of physical culture in extracurricular time consists in the totality of internal motivating forces that contribute to the systematic use by students of the requirements of a healthy lifestyle in their life: physical exercise, balanced nutrition, compliance with hygiene rules and daily routine.

A culture of health is one of the most important components of education and personal development. Extracurricular activities in higher educational institutions play a significant role in the formation and maintenance of this culture of health among students [1].

Tsakaeva, K. B. states that at present it is characteristic to understand the great national and personal value of the phenomenon of physical culture, awareness of its essence as the most important component of a person's general culture, ensuring the development of the opportunities given to him by nature for physical improvement, increasing overall performance, and improving health [7].

K.A. Babiyants focuses on the goals of practicing various types of mass sports - improving health, improving physical development, physical fitness and active recreation. This is associated with solving specific problems: increasing motor activity and functional capabilities of individual body systems, general and professional performance, mastering vital skills, enjoyable and useful leisure time, achieving physical perfection. As the most important basic component of the formation of the general culture of students, physical culture, with the help of its forms and methods, is designed to promote the harmonization of the physical and spiritual unity of the individual, strengthen health, and increase the physical and mental performance of a person [1].

L.V. Zakharova notes that extracurricular activities play a significant role in creating a culture of health among students. This process involves collaboration and interaction between teachers and students, thus creating a two-way communication. On the one hand, pedagogical influence and interaction are organized within the framework of the educational process. On the other hand, students actively participate in their own activities, which are aimed at improving their health. They take practical steps and make decisions towards a healthy lifestyle, physical activity and other health-related aspects. [2].

D. G. Radchenko points out that a culture of health is an integral component of a person's general culture, providing a certain level of knowledge, skills and abilities regarding the formation, reproduction, promotion of health and characterized by a high level of culture of behavior in relation to one's own health and the health of others [6].

Y. P. Kobyakov proves the relationship between lifestyle and human health, which is a kind of rule for educating the younger generation [4].

The task of teachers of the department of physical education in a higher education institution is to use both classroom and extracurricular forms of physical exercise in students' free time. The survey "Leisure of students" on the main informative scales showed that students from the CG have a slight increase in all components, while students from the EG show significant positive dynamics.

Table 1

Generalized results of the survey (questionnaire "Leisure of student youth") of students from the EG (comparative analysis)

Scales	Ascertaining stage data						Formative stage data					
	Constantly		Sometimes		Rarely		Constantly		Sometimes		Rarely	
	people	%	people	%	people	%	people	%	people	%	people	%
Physical exercises (morning exercises, health jogging, etc.)	44	eleven	205	51.6	149	37.4	159	39.9	192	48.3	47	11.8
Leisure	44	eleven	205	51.6	149	37.4	176	44.2	184	46.2	38	9.5
Classes in sports sections	41	10.3	207	52.0	150	37.7	89	22.4	207	52.0	102	25.6
Maintaining hygiene rules	34	8.5	202	50.8	162	40.7	59	14.8	216	54.3	123	30.9
Balanced diet	43	10.8	182	45.7	173	43.5	148	37.2	138	34.7	112	28.1

Table 2

Generalized results of the survey (questionnaire "Leisure of student youth") of CG students (comparative analysis)

Scales	Ascertaining stage data						Formative stage data					
	Constantly		Sometimes		Constantly		Sometimes		Constantly		Sometimes	
	people	%	people	%	people	%	people	%	people	%	people	%
Physical exercises (morning exercises, health jogging, etc.)	41	10.4	203	51.9	148	37.7	54	13.7	206	52.5	132	33.8
Leisure	41	10.4	201	51.3	150	38.3	65	16.6	213	54.3	114	29.1
Classes in sports sections	39	11.7	195	49.8	151	38.5	47	11.9	206	52.5	139	35.6
Maintaining hygiene rules	31	7.9	196	50.0	165	42.1	36	9.2	196	50.0	160	40.8
Balanced diet	45	11.5	178	45.4	169	43.1	63	16.1	180	45.9	149	38.0

As can be seen from the table data, there is an increase on all main scales. Thus, during leisure time, 29.9% more students (115 people) began to engage in physical exercise (morning exercises, recreational jogging, etc.) on a regular basis compared to the initial data (positive increase); adhere to a constant daily routine, proper nutrition by 26.4% of students (105 people) more in comparison with the initial data (positive increase); 33.2% more students (132 people) began to actively relax compared to the initial data (positive increase). Positive changes are also visible regarding participation in various sports and training.

Extracurricular activities provide students with the opportunity to gain additional knowledge and skills in the field of health, as well as develop their interests and talents. It helps students not only to overcome mental and physical challenges,

but also to understand the importance of a healthy lifestyle and its impact on personal well-being.

Extracurricular activities in higher education institutions may include various types of classes and sporting events aimed at strengthening the physical health of students. This could be sports sections, training, competitions, as well as participation in sports teams. Such activities not only stimulate students' physical activity, but also build their self-confidence, discipline, team spirit and desire to achieve results.

In addition to physical activity, extracurricular activities may include other aspects of health culture, for example, holding seminars, lectures and master classes on important topics such as nutrition, disease prevention, the basics of a healthy lifestyle, etc. These events provide students with the opportunity to expand their health knowledge and learn how to make good decisions about their health.

In addition, extracurricular activities contribute to the socialization of students and the formation of healthy relationships between them. Through joint activities and activities, they learn to work in a team, establish contacts and interact with different people. These experiences help students not only develop teamwork skills, but also create a supportive and friendly university environment.

Extracurricular activities allow students to discover their potential, develop interests and skills in the field of health, and understand the importance of a healthy lifestyle in achieving personal well-being.

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14–15 岁足球运动员身体成熟度与一般身体和技术表现的相关性
CORRELATION OF SOMATIC MATURITY AND GENERAL PHYSICAL AND TECHNICAL PERFORMANCE OF 14-15 YEAR-OLD FOOTBALL PLAYERS

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注解。 本文讨论了在评估年轻足球运动员训练中的运动能力水平时考虑躯体成熟度的重要性。 作者对14–15岁足球运动员的躯体成熟度指标与一般身体和技术准备程度进行了相关性分析。 获得的结果证明，在评估年轻足球运动员的总体身体、技术准备情况和潜力时，需要考虑躯体成熟度。 这凸显了身体成熟度在年轻足球运动员的发展和职业生涯准备中的价值。

关键词：峰值速度、身体和技术准备、足球运动员、相关分析。

Annotation. *This article discusses the importance of taking into account somatic maturity when assessing the level of motor abilities in the training of young football players. The author conducts a correlation analysis between indicators of somatic maturity and general physical and technical performance among football players aged 14-15 years. The results obtained prove the need to take into account somatic maturity when assessing the general physical, technical performance and potential of young football players. This highlights the value of somatic maturity in the context of the development of young footballers and their preparation for a professional career.*

Keywords: *peak height velocity, physical and technical performance, football players, correlation analysis.*

Introduction.

Football is the most popular sport in the world in which people of all levels and ages compete with each other. The identification and development of young football players capable of achieving professional status has become increasingly important in recent decades. But at the same time, the productivity of children's sports institutions that train highly qualified football players remains very low [1].

One of the reserves in the system of training young football players is seen in improving the organization of the educational and training process based on taking into account the somatic maturity of athletes and the level of motor abilities. Biological patterns of age-related development should be the basis for planning the training of young athletes and the content of motor tests for the purpose of selection.

A number of scientists [2, 3] proposed to evaluate puberty by peak height velocity (PHV). PHV is an indicator of somatic development, during which high rates of not only growth, but also the development of other parts of the body, as well as physical performance and the development of secondary sexual characteristics are achieved [4].

Therefore, recently in sports practice they are beginning to use methods for assessing somatic maturity, since they belong to the group of non-invasive methods and are easily accessible to sports practitioners [3,5 and etc.].

Purpose of this study is to discover the relationship between indicators of somatic maturity and general physical and technical performance of football players aged 14-15 years.

Methods and organization of the study.

The following methods were used in the study: analysis of scientific and methodological literature, control and pedagogical tests (tests), methods of mathematical statistics.

Football players aged 14-15 years were tested on the following control and pedagogical tests assessing general physical fitness: 10 m run, 30 m run, upward jump with arm swing (without arm swing), standing long jump, wrist dynamometry (right and left arm), V sit-and-reach test, modified fan run (using LED sensors). Tests were also conducted to assess the technical performance of football players: dribbling the ball 10m, dribbling the ball with a change in direction 10m, dribbling the ball 3x10m, throwing the ball at a distance.

The calendar age of football players was determined as follows: for example, the group of 14-year-olds included teenagers who on the day of the survey were between 13 years 6 months and 14 years 5 months 29 days, and so on.

The Mirwald equation was used to estimate the age of peak height velocity and maturity shift in current adolescent status.

To assess the somatic maturity of football players, two main indicators were taken into account:

1. *Age of peak height velocity* is the period of time during which a child experiences the most rapid increase in body length during the teenage growth spurt;
2. *Maturity offset (MO)* expressed in years before/after the peak height velocity.

In order to determine the degree and direction of connections between indicators of somatic maturity of football players and the results of control and pedagogical tests, the Spearman rank correlation method (nonparametric method) was used.

Research results and discussion.

The results of the study are presented in tables 1 and 2

Table 1

Correlation between indicators of somatic maturity and general physical fitness of football players aged 14-15 years

Testing indicators	Chronological age, years	Indicators of somatic maturity	
		Age of the PHV	Maturity offset (conventional units)
Run 10 m, s	-0.19	0.46*	-0.42*
Run 30 m, s	-0.62*	0.41*	-0.68*
Shuttle run 3x10m, s	-0.71*	0.17	-0.56*
Standing long jump, cm	0.71*	-0.39*	0.70*
Jump top with arms swing, cm	0.62*	-0.29	0.59*
Jump up without swinging arms, cm	0.59*	-0.36*	0.62*
Deadlift dynamometry, kg	0.60*	-0.60*	0.77*
Hand dynamometry (left hand), kg	0.63*	-0.61*	0.82*
Hand dynamometry (right hand), kg	0.63*	-0.59*	0.81*
V sit-and-reach test (VSR), cm.	0.50*	-0.26	0.46*
Modified fan run, s.	-0.38*	-0.15	-0.14

Note* Correlation relationship at significance level $P<0.05$

The correlation analysis showed that the values of the indicator “Maturity offset” have higher connections with the level of physical fitness than the indicators “Chronological age” and “Age of PHV”. High correlations between somatic maturity were found with strength test scores (r=0.77-0.82).

It is believed that strength abilities are determined not only by muscle mass, but also by the tone of skeletal muscles, which was determined by hand dynamometry. In motor tests, the highest correlations were shown specifically with carpal dynamometry indicators (r = 0.81-0.82) and the “Maturity offset” indicator. The backbone dynamometry (assessing the strength of the extensor muscles of the back) was lower than the hand dynamometry, but a high correlation was also found with the indicator of somatic maturity (“Maturity offset”).

A significant correlation was found with jump tests (r=0.59-0.70). Speed tests (10 and 30 m running) showed a moderate to significant relationship with the “Maturity offset” indicator (r = -0.42-(-0.68)). The manifestation of flexibility in the “V sit-and-reach test” test showed a significant moderate relationship (-0.46). The indicator of coordination abilities “Running 3 x10 m” significantly correlated with the indicator “Maturity offset” (r = -0.56).

No significant connections were found between the modified fan running indicators and the indicator of somatic maturity ("Maturity offset"). It is possible that somatic maturation in a given age period (14-15 years) has a minor effect on the results in such a test, and as some authors [6,7] note that this test allows for a comprehensive assessment of not only speed and coordination abilities, but also the cognitive abilities of the subjects. It is believed that the brain grows to adult size by 11-12 years of age. If the child was constantly engaged in physical activity, basic movement skills are formed that allow him to successfully master technical elements already at the age of 12, since neuromuscular conduction in children increases due to the maturation of the nervous system. And most of the children in the group already had 8-10 years of training experience. Apparently, somatic maturity does not provide a significant advantage in this test and the role of the neuromuscular system increases due to the development of the brain and nervous system as a whole.

Table 2

Correlation between indicators of somatic maturity and technical performance of football players aged 14-15 years

Testing indicators	Indicators of somatic maturity		
	Chronological age, years	**Age of the PHV**	**Maturity offset (conventional units)**
Dribbling the ball 10 m, s	0.01	0.14	-0.10
Dribbling the ball with a change in direction 10 m, s	-0.05	-0.31*	0.18
Dribbling the ball 3x10 m, s	-0.49*	-0.04	-0.28
Throwing the ball at a distance, m	0.65*	-0.43*	0.72*

Note* Correlation relationship at significance level $P<0.05$

It should be noted that the correlation between somatic maturity and the level of technical performance among football players aged 14-15 years was much weaker compared to the level of physical performance.

The indicator "Maturity offset" in assessing technical performance showed a high correlation with only one test "throwing the ball into the distance" ($r=0.72$). Throwing the ball in is the only technical technique performed by field players with their hands. To throw the ball a significant distance, you must have well-developed muscle groups in the abdomen, shoulder girdle and arms. Taking into account the positive correlation relationship, we can conclude that the higher the somatic maturity of football players, the higher the level of manifestation of strength abilities will be, compared to football players with a lower degree of maturity. Thus, the degree of biological maturity makes a major contribution to the success-

ful performance of this test. In other tests of technical performance, no significant relationships were found.

Conclusion.

The correlation analysis showed that strength abilities have a strong connection with the Maturity offset, as well as with carpal dynamometry indicators. The manifestation of flexibility and coordination abilities has a weaker relationship with MO. Somatic maturity has a significant impact on the results in the throw-in test, but does not have a strong connection with other tests of technical performance in football players aged 14-15 years. Thus, the indicator "Maturity offset" is quite sensitive to the manifestations of motor abilities, and it should be taken into account in the process of control and pedagogical testing of athletes.

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俄罗斯与美国学前儿童多元文化教育比较分析
COMPARATIVE ANALYSIS OF MULTICULTURAL EDUCATION OF PRESCHOOL CHILDREN IN RUSSIA AND THE USA

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抽象的。 本文探讨了学前儿童多元文化教育的过程，作为学前教育学的现代相关领域之一。 对俄罗斯和美国的多元文化教育方法进行了比较分析。 通过对学龄前儿童教师和家长意见的研究，结合美国研究的经验，得出俄罗斯学前儿童多元文化教育的必要性的结论。

关键词：多元文化教育，学前儿童教育，俄罗斯和美国多元文化教育方法比较分析。

Abstract*. The article examines the process of multicultural education of preschool children as one of the modern and relevant areas of pedagogy of preschool education. A comparative analysis of approaches to multicultural education in Russia and the USA is carried out. Based on a study of the opinions of teachers and parents of preschool children, a conclusion is made about the need for multicultural education of preschool children in Russia, taking into account the experience of American research.*

Keywords: *multicultural education, education of preschool children, comparative analysis of approaches to multicultural education in Russia and the USA.*

Expanding cooperation between countries in the field of education, science and culture in the interests of ensuring peace, universal respect and justice is recognized by UNESCO as a priority area of cultural and pedagogical development of the 21st century. This position is enshrined in the Incheon Declaration “Education 2030”, which contains a new concept for the development of world education until 2030. Its resolution substantiates the sustainable dependence of the development of world education on the interaction of all countries in creating a unified multicultural environment built on the education of tolerance, the ability to live and cooperate with representatives of other ethnic groups, religions, cultures, races on the basis of knowledge and understanding of the differences and commonality of human values.

In modern realities, children from an early age begin to experience the influence of different cultures. Therefore, the formation of ideas about one's country and the diversity of world culture must begin from preschool age. It should be noted that multicultural education of preschool children is a fairly new area of pedagogical theory and practice, and its development is impossible without studying global trends and taking into account the experience of foreign countries, in particular the United States, since it was American researchers who first attempted to build the concept of multicultural education [1, 2].

The choice of the American experience of multicultural education as a comparative subject of study is also due to the fact that, despite the socio-political differences in the life of American and Russian society, there are a number of similar factors that influence educational processes, such as: vast territory, many national cultures, multi-ethnic and multilingual composition of the population, diversity of forms of religious and cultural life. The comparative analysis was based on the following criteria: development of the conceptual apparatus of the area under study, the dominant cultural approach; organization of social institutions, development of normative documents in the field of multicultural education.

The ideas of multicultural education in the USA begin to be introduced into educational policy already in the 60s of the last century and are enshrined in government documents and programs (Civil Rights Act - 1964, Act of bilingual education – 1968, etc.) Initially, the multicultural education of children was dominated by the concept of forming an image of an American citizen, in which many national and racial cultures would be integrated. It was assumed that children 3-7 years old would quickly adapt and adopt cultural norms and foreign language forms of communication, and through early multicultural education a new unified community of the American people would be formed. However, by the mid-90s, this approach showed its ineffectiveness and was criticized both by representatives of education and parents of students, since it limited the preservation of national identity and native language.

In Russia in this time period 1960 - end of 1990. Only the first attempts to understand multicultural education are taking place. Its goal was formulated as familiarization with the cultural values of its people, the formation of a culture of interethnic communication, based on strengthening the all-Russian identity. Despite the different time period, already at the first stage it is possible to trace parallels in the development of ideas of multicultural education in Russia and the USA, namely, the emphasis on the formation of national and civic identity. But, unlike the American system, Russian preschool education has managed to overcome the difficulties of integrating national cultures. This fact can be explained by the accumulated experience in the field of international and interethnic education in the history of Russian education. This was also facilitated by the developed regulation

of the Ministry of Education of the Russian Federation on a preschool educational institution with an ethnocultural (national) component of education with proposed methodological recommendations (1997).

At the next stage, covering the first decade of the 21st century, differences in the development of multicultural education in Russia and the USA intensify. The attention of American researchers in this period is focused on the development of practical models built on differentiated forms of organizing multicultural education and their active implementation in practice. According to the US Department of Education, by 2010, children of migrants and national minorities received primary education in adaptation groups, special support groups, integrated and partially integrated classes, and there were also programs for individual psychological and social support for them. It is noteworthy that since the early 2000s, a number of American universities have approved a special training program to support early multicultural education of children.

In contrast to the American experience, in Russian preschool education the integration approach remains dominant; a common content of multicultural education is being developed for all, based on the basic values enshrined in the Concept of the National Educational Policy of the Russian Federation (2006) and the Concept of Spiritual and Moral Development and Education of a Russian Citizen (2009).

The current stage of development of multicultural education in Russia and America shows further differences in approaches to its organization and content. The American goal of multicultural education is aimed at creating a multicultural environment that ensures the development of diversity and personal differences of each member of society, that is, his self-identity. This goal was reflected in the 2015 primary education reform, one of the most expensive projects, which provides support for multicultural education not only at the educational, but also at the socio-economic level. According to a study conducted by the US National Education Association (2019), 86% of migrant and minority families express reasonable satisfaction with early childhood education [4].

A distinctive feature of multicultural education in modern Russian education is its focus on the development of the individual as a future citizen of the Russian Federation, the formation of civic identity based on the integration of national and intercultural traditional values. We should also add the activity of domestic researchers in developing the content of programs on multicultural education “We are together” “Multicultural education of preschool children: methodology and practice” for preschoolers in a kindergarten [2].

To conduct a comparative analysis, we also turned to how the content of multicultural education in the two countries is revealed according to the opinions of various scientists and researchers. In Russia, A. N. Dzhurinsky believes that mul-

ticultural education is, first of all, the introduction of the younger generation to national and world culture for the purpose of spiritual enrichment, and the formation of readiness and ability to live in a multicultural environment [1].

In the USA, J. Banks emphasizes that multicultural education is a philosophy of thinking, an innovative process that ensures equality of all social groups in receiving quality education, regardless of gender, developmental characteristics, racial, ethnic, linguistic and cultural background of the child [3]. And K. Grant believes that, first of all, this is upbringing, which includes not only ethno-racial and linguistic components, but also social and gender differences and preferences [4].

Thus, after conducting a retrospective analysis of the development of multicultural education of children, as well as modern approaches to the semantic definition of its concept, we identified general trends and differences in multicultural education in Russia and the USA. We identified the following as general trends in the development of multicultural education in Russia and the USA:

• recognition of the value of multicultural education for the development of modern society, orientation to international legal documents of the UN and UNESCO in the field of preserving national and intercultural diversity;

• ensuring equal rights and opportunities to receive quality education for everyone, regardless of nationality and ethnicity;

• approval of the need for multicultural education from an early age;

• development of tolerance as an important component of multicultural education.

Analysis of multicultural education of preschool children in Russia and the USA also made it possible to identify a number of significant differences, namely:

- in Russia, the methodological basis of multicultural education is a humanistic approach that determines personal development on the basis of basic spiritual, moral and civic values. In the USA - multiculturalism, which recognizes the plurality of personal differences, including racial, national, gender differences, as well as disabilities;

- in Russia, multicultural education is considered as a purposeful process of development and formation of the personal qualities of a preschooler. In the USA, this is a social process, an integral system, not limited by the framework of education, but involving the interaction of all structures of society: political, economic, financial.

In order to study the possibility of improving the work on multicultural education of children in preschool educational organizations in Russia, a survey of teachers and parents of preschool children was conducted. 20 teachers and 30 parents took part in the survey. Analysis of the survey showed that 43% of parents of preschool children have only some ideas about the term “multicultural education”, 37% are familiar with this term, 20% are unfamiliar with this concept. Despite

this, more than 50% of parents certainly consider it possible and necessary to organize work on multicultural education in kindergarten. 80% of parents believe that responsibility for multicultural education of children is carried out in the joint work of teachers with parents, and only 20% noted that this is the work of parents alone. Only 36% of parents believe that preschool organizations carry out work on multicultural education of children at a satisfactory level, however, it is the educational assistance of teachers (expanding the range of knowledge about the diversity of national cultures and traditions) that can help parents in studying the issue of multicultural education of children. It is worth noting that 30% of parents were against the implementation of a program for multicultural education of children in kindergarten.

An analysis of teachers responses showed that more than 55% of teachers believe that multicultural education is an urgent task in the work of a kindergarten, and 65% agree that introducing children to the cultural values of their people, developing tolerance and respect for the national traditions of other peoples is one of the most important factors in the development of a child's personality. But also 78% of teachers noted an insufficient number of educational and methodological materials, limited educational work among preschool teachers, which makes it difficult to solve the problems of multicultural education of children. In response to a set of questions about positive foreign experience, more than 70% of teachers noted that they have limited knowledge of it, but also consider it possible and promising to study it and partly use it in their work, taking into account domestic priorities.

The results of a survey of preschool teachers and parents of preschool children actualize the task of strengthening educational and educational work to support the multicultural education of preschool children, taking into account the positive experience of American researchers. Promising areas of this activity include the following:

• organization of teamwork of teachers, parents, social services, public organizations for multicultural education of children;

• use of a differentiated approach based on variable forms of organizing multicultural education and diversity of technologies;

• implementation of programs for training teachers in early multicultural education of children;

• inclusion of interactive and media information sources in the process of multicultural education of preschool children.

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有氧运动条件下肥胖男性健康的综合校正
COMPLEX CORRECTION OF HEALTH OF MEN WITH OBESITY IN THE CONDITIONS OF AEROBIC PHYSICAL ACTIVITIES

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注解。 在健身过程中采用自动、客观的实时体力活动控制，改进了强身健体、适应性体育锻炼的方法。 当使用膳食补充剂形式的适应原 trecrezan 时，旨在纠正健康状况有一定偏差的人的健身训练的有效性会增加。 Trekrezan 可以作为增加健身俱乐部游客积极性的额外手段。

关键词：健身、肥胖、多医生计划、trekrezan。

Annotation. *The use of automatic, objective control of physical activity in real time in the fitness process improves the methods of health-improving and adaptive physical culture. The effectiveness of fitness training aimed at correcting the condition of persons with certain deviations in health increases when using the adaptogen trecrezan in the form of a dietary supplement. Trekrezan can be used as an additional means to increase the motivation of fitness club visitors.*

Keywords: *fitness, obesity, Multi Doctor program, trekrezan.*

An effective means of helping to solve health problems is the competent use of physical education in combination with substitutes for natural adaptogens [1,3],

etc. One of these drugs is the drug trecrezan, a broad-spectrum adaptogen [2,5]. However, the drug was not used in fitness practice. This emphasizes the relevance of our chosen direction of research. In recent years, simulators have been created that provide continuous monitoring of the condition of those training in a fitness club. (Multi Doctor) simulators limit physical activity when, for example, a given heart rate is reached. There is also a training program for these simulators. However, this program has not been studied in conditions of health-improving and adaptive physical culture. This determined the purpose of the study - to develop a methodology for practicing health-improving and adaptive physical culture, aimed at comprehensive correction of the health of men aged 25-40 years with 1-2 degrees of obesity.

The subjects of the study were men aged 22 to 35 years, suffering from grade 1-2 obesity. The subject of the study was the physiological qualities of the subjects.

Materials and methods. The training process took place at the Multisport and Zebra fitness clubs. The subjects under observation were men (n=51). All subjects were beginners. The observation period was 7 months for all participants. At the beginning and at the end of the experiment, each subject was tested on Multi Doctor equipment [6,7]. The subjects voluntarily took trekrezan. The course of taking the drug began from the first day of training. The trainees were divided into the following groups: control (n=25) - subjects with grade 1-2 obesity who did not take trekrezan under fitness conditions; main (n=26) – subjects with grade 1-2 obesity who took trekrezan 0.2x 2 times a day for 21 days once in the training cycle. Classes were held 3 times a week. The 60-minute classes consisted of 2 inextricably linked parts: a) a circuit of exercise machines and working with one's own weight, which included 10 stations. The exercises were performed in a circle with light or minimal weights. At the end of each circle there was a clear rest interval. The total load-rest time reached 30 minutes. Exercises used: a) leg extension while sitting in the simulator, b) lying shin flexion, c) sitting hip abduction, d) vertical block pull-down to the chest, e) horizontal pull-down to the stomach while sitting, f) lying dumbbell press on an incline bench, g) abduction of arms while sitting on a machine, h) lifting of legs while hanging, i) lying twisting of the body, j) hyperextension.

Work at each stage lasted no more than 30 minutes without rest. Each subject had a heart rate monitor installed. The basis for determining the mode of muscle activity was the heart rate (HR). b) the second part of the training process took place on a cardio machine, the operating mode of which was selected individually. The analysis of the level of health and physical fitness of the subjects was carried out according to the "Multi Doctor" program, developed by the Cologne Institute for Disease Prevention and Nursing Care (IPN). Health factors assessed.

The “Multi Doctor” program consists of sections: 1) favorable ratio of muscle and fat tissue; 2) good endurance and a healthy heart; 3) harmonious muscle development; 4) normal mobility; 5) optimal range of motion in joints; 6) stable spine; 7) maximum oxygen consumption (MOC); 8) stress resistance. People whose overall score falls within the “normal performance zone” are healthy. Zone of normal results. When conducting the test, the zone whose results provided a minimum level of health was considered. All indicators are differentiated by age and gender. Scoring system. Through differentiated analysis and the use of various testing methods, the overall score was determined. Anthropometry + Futrex 6 100. Included measurement of height and weight, waist-hip ratio, measurement of internal fat using the Futrex device. Based on the results, the degree of risk of cardiovascular disease and the proportionality of physical development were assessed. The stress test is based on variation pulsometry. Includes an orthostatic test and BMD measurement. Spine examination (Medi Mouse). Medi Mouse is an automated device that allows you to determine types of exercises that are contraindicated for the subject (Mathias test). Mobility testing (Flex Check). Allows you to identify problem areas and outline ways to eliminate the problem. Muscle strength testing (Back – Check) – the device allows you to evaluate the effectiveness of strength training. Evaluation of test results. The overall health score is determined based on the analysis of the examinations performed. The diagnosis of stress disorder was allocated in accordance with ICD-10. The level of motivation was determined by questionnaire. A high level of motivation ranged from 8 to 10 points, an average level from 5 to 7, and a low level from 0 to 4 points. Statistical processing of data was carried out using t - test. The arithmetic mean (M) and its error (± m) were calculated [4].

Research results. Examination of control group subjects. Among 25 men in this group, it was found that fitness training caused the following changes in the physical qualities of those involved. Thus, flexibility increased by 27%, endurance increased by 17.1%, strength increased by 4.88. Coordination of movements remained within 7.2±0.1 s. Changes in other parameters are illustrated in Table 1.

Table 1.

Changes in physiological qualities of obese men 1-2 degrees who did not take trekrezan in the training cycle (control).

PARAMETER	Start	End
Lean mass (kg)	50,3±4,2	52,1±4,1
Fat mass (%)	33,3±2,7	29,6±2,1
Posture/ spine (^{0})	5,1±1,2	4,5±1,1
Stress test	12,4±1,5	8,3±1,1*

Note * - significant at $p<0.05$.

From the table 1 shows that fitness training has a positive effect on the studied qualities of men in the control group. In the following observations, we examined men in the main group. Training has been found to cause the following changes. Thus, flexibility significantly increased by 33.7%, endurance increased by 15.9%, strength remained in the range from 27.4±0.99 to 29.5±1.1 kg. Coordination of movements remained within 7.7±0.1 s. Other changes are illustrated in Table 2.

Table 2.

Changes in physiological qualities of men in the main group.

PARAMETER	Start	End
Lean mass (kg)	50,9±4,5	52,7±4,1
Fat mass (%)	33,7±2,4	28,9±2,2
Posture/ spine (^{0})	4,9±0,9	3,9±0,5*
Stress test	14,1±1,6	9,4±1,2*

Note * - significant at $p<0.05$.

Table 2 shows that fitness training according to the "Multi Doctor" program has a positive effect on the physiological qualities of obese men who took trekrezan. Naturally, for obese people it is necessary to take into account the impact of obesity on their ability to perform certain tests [8,9,10].

Conclusions: the use of simulators and the "Multi Doctor" program is justified from the point of view of the literature. Thus, the results of our study are satisfactorily explained and allow us to conclude that the use of simulators and the "Multi Doctor" program, as well as the combined use of trekrezan in aerobic fitness training, is appropriate and justified. Consequently, the tasks assigned to us have been solved and the goal has been achieved.

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来华留学生教学中的文化成分
CULTURAL COMPONENT IN TEACHING INTERNATIONAL STUDENTS IN CHINA

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摘要　留学生的文化教学一直是国际中文教育不可或缺的一部分，它对于深化文明交流互鉴，推动中华文化更好走向世界具有重要意义。本文基于语言世界图景理论，分析了来华留学生教学中文化成分的教学方法，探讨了传统文化与当代文化有机结合，在教学中注重跨文化交际，在教材中突出地域文化等问题。

Annotation. *Cultural studies for international students have always been an integral part of international Chinese language education. This is important for deepening civilizational exchanges and mutual understanding, as well as promoting Chinese culture to the world. Based on the theory of the linguistic picture of the world, this article analyzes approaches to the study of the cultural component by foreign students, explores the organic combination of traditional and modern culture, pays attention to intercultural communication in teaching, and emphasizes regional culture in the author's textbook.*

Keywords: *foreign students in China, cultural component, Chinese language picture of the world.*

Introduction. According to statistics from the Ministry of Education[1], nearly half a million students from 196 countries came to China in 2018. Foreign students will broadcast Chinese culture to their homeland; will be a connecting link, ambassadors of the Chinese language, transmitting the voice of China to the outside world. Undoubtedly, their number will grow as China moves closer to the rest of the world.

At the World Chinese Language Conference (December 9, 2023), Vice Premier Ding Xuexiang said, "Language is a tool of communication, a carrier of culture, and a bridge for promoting exchange and dialogue among human civilizations." This thesis is confirmed by the words of President Xi Jinping, who noted

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that learning each other's languages, understanding the history and culture of each other's countries will contribute to mutual knowledge and bringing people closer together, as well as the creation of a community of human destiny[2].

In this regard, the process of studying for foreign students in China should be considered as an activity aimed at interacting with Chinese culture and Chinese citizens. Foreign students will unknowingly spread what they see and hear in China after returning home, so teaching Chinese as a foreign language is not only teaching the language, but also teaching Chinese culture[3].

Some modern textbooks on culture do not comply with the principles of regionalism and practicality, focused on organizing specific practical educational activities; multiculturalism and intercultural communication, allowing respect for cultural individuality, while paying attention to cultural contrasts. Chinese culture courses and Chinese language courses have not yet achieved effective articulation, where language teaching is imbued with cultural elements and language knowledge is involved in cultural courses[4].

Teaching Chinese as a foreign language includes teaching language skills and cultural awareness because no matter how diverse languages are, they are still important carriers of culture[5]. The study of the cultural component in the international practice of Chinese language teaching was discussed at the 20th Party Congress, in particular, it is necessary to "accelerate the creation of Chinese discourse and Chinese storytelling system, tell Chinese stories, spread Chinese voices and present a credible, beautiful and respected image of China."[6]

Applied significance of the theory of language picture. The theory of the linguistic picture of the world is associated with the introduction of the concept of "physical picture of the world" by the German physicist G. Hertz[7]. The physical picture of the world represents a generalized image of reality, a universal human ideal picture of nature.

The scientific picture of the world characterizes the holistic image of the subject of scientific research in its main system-structural characteristics, formed through the fundamental concepts, ideas and principles of science at each stage of its historical development[8].

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The concept of "picture of the world" is interpreted as a multi-level system of concepts reflecting the natural, cultural, social and virtual realities of the past, present and future[9]. The picture of the world is formed in the process of socialization of the individual, and is the result of the reproduction by individual or social/national consciousness of reality and a general understanding of the world.

The most important role in the process of forming a picture of the world is played by language, which, in accordance with the teachings of V. Humboldt, is a continuous creative process that expresses the individual worldview of the people. Since "each language contains a unique picture of the world," therefore, the linguistic picture of the world means the concentration of native speakers' ideas about the real objective world[10].

L. Weisgerber[11], who made a significant contribution to the creation of the theory of the language picture, argued that the discovery of the world occurs "through the prism of language," since language is an intermediate world between man and the outside world.

Since speakers of different languages have different lifestyles, have different cultural backgrounds and national psyches, the world they see through the prism of their language is also different. If a person understands the linguistic picture of the world, this is tantamount to integration into culture and customs[10].

Let us give examples of the differences between the Chinese and Russian language pictures.

Tea party. People in China and Russia love to drink tea, but in China, meeting someone for tea means tasting the tea, chatting, and improving relationships. If in Russia someone invites you "Let's go have tea!", do not think that they are talking only about tea, but bread, cheese, sausage, jam, sweets are waiting for you on the table, and honey, sugar, milk are also usually added to tea or lemon. The phrase, which has the same meaning, reflects the differences in tea drinking culture. Some scholars believe that Chinese tea culture is more conducive to developing the body and mind, cultivating emotions, which can promote social harmony, as well as harmonizing interpersonal relationships. In Russia, tea is a way of entertaining guests, expressing friendship and hospitality. The Chinese tea ceremony is characterized by an elegant ambience during tea drinking and strict rules. During tea drinking, the Chinese relieve themselves of fuss, seek spiritual harmony, and Russians drink tea to quench their thirst, warm the body, ease a busy life and communicate with people[12]. And yet, the main thing in Russian tea drinking is com-

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munication. Tea in Russia has long been a reason for long, leisurely conversations, a way of reconciliation and resolving business issues. In the Russian tradition, it was not customary to remain silent at the table. Silence in Russian tea drinking is seen as a sign of deep disrespect for the owners of the house[13].

Soup. The Chinese word for "soup" refers to the concept of "hot water", and in most cases the word refers to the boiling juice in which meat, fish or vegetables are cooked. When the Chinese eat this dish, they drink the broth without vegetables or meat, as they are only needed for flavoring and nutrition. There is a Chinese idiom: "empty stew without meat or fat"[14], which is why the Chinese use the phrase "to drink soup." Russian "soup" is similar to the stew in Northeast China, which contains a lot of meat, fish, vegetables and other ingredients[14]and the dish turns out thicker, which is why the Chinese use the word "eat". As we can see, the linguistic picture of the world can not only help two parties with different linguistic and cultural experiences communicate in a comfortable and cozy environment, but can also be used in teaching cultural contrasts to study differences in linguistic expressions, which is not only interesting, but also better remembered .

Learning a language means studying the history and culture of a people, as well as spiritual concepts, ways of thinking, worldviews, outlooks on life and values. We believe that the theory of the linguistic picture of the world is the basis for improving the educational activities of foreign students based on the development of the cultural component of educational courses. Next, we present some methods for solving this pedagogical problem.

(1) Organic integration of traditional and modern culture.

The theory of the linguistic picture of the world assumes that each national language expresses social reality in its own way, but this, in turn, is influenced by global and cultural factors that a given nation faces[15]. Traditional centuries-old culture is certainly an integral part of Chinese culture, but its content must be carefully selected to suit modern values, be easily understood by foreign students, and be suitable for teaching in combination with language knowledge.

For example, during the pandemic, the Chinese people developed a great anti-epidemic spirit: "Life comes first, the whole country is one heart and mind, sacrifice your life and forget your own death, respect science and share a common destiny." Therefore, Chinese technologies are used to build high-speed railways, ports, terminals, bridges and other large-scale projects in many countries. The whole world is watching the rapid development of the Chinese logistics industry under the international Belt and Road Initiative, which not only allows Chinese manufacturing to go overseas, but also creates convenience for other countries.

[13] Fetisova T.A. K. S. Koval. Cultural traditions of Russian tea drinking // Bulletin of Culturology, No. 4 (75), 2015, pp. 174-176.

[14] 刘婷婷. 中俄饮食文化差异与对外汉语饮食类词汇教学[D].湖南师范大学, 2022.

[15] 刘颖. 俄汉民族象征中的语言世界图景研究[J]. 科技信息（学术版）,2008(34):119.

Some foreign students represent countries that are experiencing changes caused by Chinese initiatives and technologies, so such topics will interest them more, encouraging them to actively discuss the features of Chinese culture in the field of management, business etiquette, etc.

(2) Respect for cultural identity and intercultural communication.

The educational experience of international students is influenced by many factors, including cultural traditions, religion and educational models in their countries of origin[16]. The educational practices of different countries are based on different scientific approaches, theories and concepts, so foreign students have different learning styles. Therefore, it is necessary to fully reflect intercultural communication in teaching Chinese culture. Successful intercultural communication can not only effectively help foreign students learn the language, but also help them better understand Chinese culture[5].

For example, when studying the topic "Chinese Dragon", students should first talk about the image and meaning of the dragon in their culture, and then explain the origin, development and symbols of the dragon in Chinese culture, which allows not only to respect each other's culture, but also to realize intercultural communication. Only by understanding what a Chinese dragon is can students understand why the Chinese describe the Great Wall as a huge dragon, and why there is a custom - a race on "dragon boats". In addition, you can give students practical tasks so that they go in search of life in the "dragon elements", take photographs or record videos, and share and exchange impressions live. Such voluminous (three-dimensional) tasks "comparison + explanation + practice" help increase motivation in studying Chinese culture and develop students' independent research and information culture skills.

(3) Presentation of regional culture in educational materials for practical training.

Textbooks are fundamental to learning; a good textbook can not only take you into the sea of knowledge, but also make students eager to explore independently. And if educational materials contain a cultural component, then the cognitive process will be more interesting and useful. Professor Zhou Xiaobing (1996) argued that cultural teaching of international Chinese should pay attention to both national community and regional characteristics[17]. Regional cultures are diverse and rich in content, and the sights, natural scenery, traditional folklore in regional cultures are high-quality material for studying China's national culture[4]. Including regional culture content in textbooks can help international students understand the culture of the area where they study, gaining a deeper understanding of the diversity of Chinese culture[17].

[16] 胡云波,阿娜尔.建构主义视角下中国文化课教学实践与探索[J].教育教学论坛,2023(08):101-104.

[17] 柯齐.云南地域文化课程教学大纲设计探究[J].大学,2023(17):46-49.

One example of the use of a cultural component in teaching foreign students is the textbook on Chinese language and culture "This is Jiangxi"[18,19], harmoniously combines educational material on the Chinese language and regional culture. In the manual, the target objects are summer camps of Chinese language and culture, other forms of work with foreign groups studying Chinese on a short-term program, or individuals coming to Jiangxi Province.

The teaching material simulates the real scenarios of foreigners' learning and life in Jiangxi Province, integrates the cultural elements of Jiangxi Province, and develops a unique content structure to create a real learning environment. All dialogues in the texts illustrate the most famous attractions of Jiangxi Province. For example, the first part of the Study Tour guide describes a walking tour of Wanshougong Street ("Delicacies Street") and shops where cuisine and specialties of Jiangxi Province are presented. Acquaintance with the sights of the province is organized in the form of excursions. In the second part of the guide "Culture", in the form of a dialogue, detailed information is revealed about porcelain in the city of Jingdezhen, the Tengwan Pavilion, brushes in the village of Wengang, tea culture, opera, the Badashanren Memorial, the Bailu Cave Academy, Chinese medicine in Zhangshu, and the Hakka culture. At the end of each lesson there is a cultural introduction, and there is additional material on a specific topic. The assignments are practical problems: "Choose a place in Jiangxi Province that you want to visit and make a trip plan for one day," "Tell in Chinese about the type of tea you drank today." In addition, the textbook is accompanied by video lessons, some of which are recorded during a field trip with international students, so that students can gain an immersive learning experience.

The presented textbook confirms the thesis that when students have the opportunity to go beyond the campus and get acquainted with real life, they will use the knowledge acquired in the textbook to conduct communicative dialogues.

Conclusions. Language is the carrier of culture; at the same time, culture is the soil for language. Thus, language and culture complement each other in teaching Chinese to international students. When teaching Chinese, the main content should be Chinese history and culture. At the same time, it is necessary to respect and understand the differences that exist between our country and the countries of origin of international students.

Only flexible integration of the cultural component can contribute to foreign students' understanding of Chinese culture, their active integration into Chinese culture, awakening interest in independent research.

[18] 周婷，宋文杰，胡逸舟，等.这里是江西.游学篇[M]. 南昌：江西高校出版社，2022.
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英国和俄罗斯居民眼中的世界语言图景
THE LINGUISTIC PICTURE OF THE WORLD THROUGH THE EYES OF THE INHABITANTS OF BRITAIN AND RUSSIA

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抽象的。 本文界定了“语言世界观”的概念，通过认知语言学的棱镜审视其本质，并对词组与谚语之间的差异进行比较分析。

关键词：语言世界观、认知语言学、心态、短语单位、谚语。

Abstract. *This article defines the concept of “linguistic worldview”, examines its essence through the prism of cognitive linguistics and makes a comparative analysis of the differences between phraseological units and proverbs.*

Keywords: *linguistic worldview, cognitive linguistics, mentality, phraseological units, proverbs.*

In the second half of the 20th century, it became necessary to analyze the role of language in human cognitive activity. Language is the most natural access because “we know about the structures of consciousness only thanks to a language that allows us to communicate about these structures and describe them in any natural language” [2]. To achieve these goals, a new scientific direction appears which later became known as “cognitive linguistics”.

To date, cognitive linguistics has become an independent science, the subject of which is the cognitive mechanism that arises in the mental operations that occur in the human brain when using language.

The linguistic picture of the world is currently one of the most interesting topics in cognitive linguistics. Different languages show that there is a national

way of thinking. The study of this issue has a long history, but the concept itself remains largely uncertain.

The linguistic picture of the world is a way of perceiving the vision of the world reflected in language, a conceptualization of reality.

It represents a person's knowledge of nature, society, the world and forms the basis of culture. It is also called a grid that is thrown over a person's perception which affects his assessment and vision of various situations and events through the prism of language, as well as the experience acquired with it which includes not only a huge number of nomination units, but also the rules of their functioning and education [3].

In the course of analyzing the cultures of different countries, one can certainly encounter a large number of cultural differences due to many factors. The main factors reflecting the diversity of cultures include:

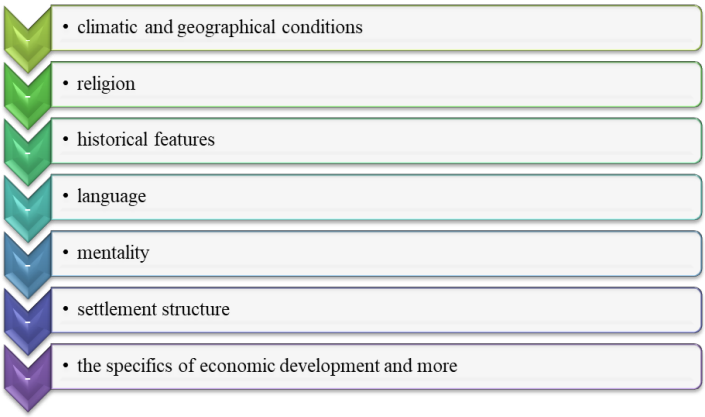

Figure 1. *Factors reflecting the diversity of cultures.*

It is known that language is of particular importance among the above list, since it is a means of expressing a person's thoughts, a reflection of his perception of the world around him. Unlike natural conditions, historical palette and other causes of cultural differences, language comes from the person himself, whereas the difference in ideology and the set of mental skills and spiritual attitudes inherent in an individual or a social group appeared much earlier. Thanks to the language, it is possible to analyze the processes of mental development of representatives of various ethnic groups. Language is a mirror of culture, reflecting the faces of past cultures, their perception of the category of worldview and worldview [4].

Thus, language is the most important component of human culture, its multifaceted and unique phenomenon. It comes from culture and expresses it.

Culture is a collection of the results of human activity in all its spiritual and material manifestations which are the hallmarks of a particular society or social group.

In the course of comparing English and Russian linguistic cultures, it is important to cover as wide a range of traditions as possible. The analytical approach reveals that different cultures reveal different temporal orientations preserved in the system of thinking of representatives of these cultures.

The linguistic picture of the world covers several components, however, this research will be aimed at identifying the national mentality of the Russian and English peoples, describing proverbial and phraseological pictures of the world which are considered a mirror of ethnic culture. Phraseological units reflecting the sphere of visual perception reveal the peculiarities of different structural languages and cultures, since the sensory visual world plays an important role in language [1].

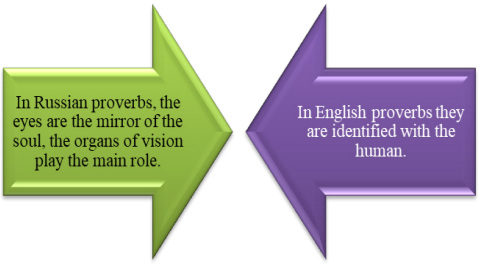

Figure 2. *Representation of the organ of vision in English and Russian proverbs.*

The organ of vision is represented as an object of characterization. For example, in English proverb “the face is the index of the mind (heart) and in Russian proverb “the face is an indicator of the soul”. Phraseological units in this case denote fragments of the physical, mental and intellectual spheres and reflect the external characteristics of the organ of vision based on the qualitative attributes of the object of visual perception. The organ of vision is comprehended taking into account the concepts of plants, artifacts, and animals. For example: eyes as black as currants (like currants); eyes as black as coals. Cf. English: a fishy eye - “a dull, lifeless look”; steely-eyed - “steely gaze, firm, impartial”; dewy-eyed look - “eyes as clear as dew.” Phraseological units also reflect the characteristics of a person’s visual ability, which is interpreted according to the principle of qualitative belonging of the object. The organ of vision is comprehended taking into account the ideas of animals and birds. For example: eyes like a cat, eyes like a falcon, eyes like a hawk, eagle eye. Cf. English: an eagle eye - “about a sharp-sighted man”; have (got) the eyes like a hawk -”have sharp eyesight, be very observant.”

When phraseological units represent the space in which objects are removed, in metaphorical meanings they are shown as fragments of the physical and mental world, which reflects the situation of removing objects of vision. For example: “out of sight - out of mind” means to disappear from sight (out of sight). For example: I looked after him with regret and envy until he disappeared from my eyes (F. Gladkov. Freemen). Elya felt that the patron would only get her off her hands, he would immediately stop thinking about her, then she also imagined: out of sight - out of mind (V. Astafyev. The king is a fish).

In English, these phraseological units can have equivalents with the direct meaning of disappear from sight: pass out of sight; vanish from view; banish from one’s presence; get rid of presence. However, the proverb “out of sight - out of mind” is perceived by another mentality in its own way and is expressed through proverbs with different meanings: long absent, soon forgotten; if you are away for a long time, they will quickly forget.

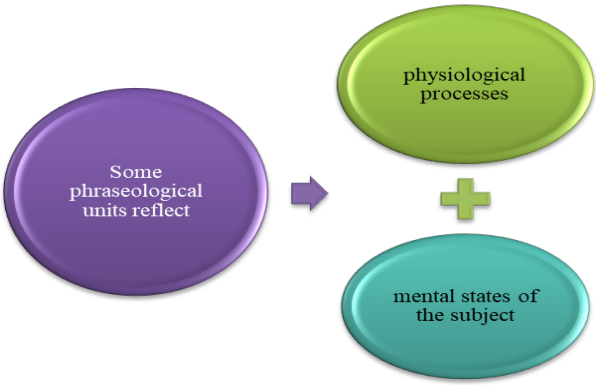

Figure 3. *Reflection of the subject’s state through phraseological units.*

Some phraseological units reflect the physiological or mental states of the subject’s processes. Such processes are associated with the temporary or irreversible cessation of vital activity of the body. In this case, the description of the physiological state is realized on the basis of verbs denoting the opening or closing of the surface. For example: eyes stick together (close). Cf. English: put one’s eyes together – Russian: close your eyelids, fall asleep; English: close one’s eyes - Russian: die; fall asleep forever”. “Alyokhin was very sleepy; he got up early to do the housework, at three o’clock in the morning, and now his eyes were closing” (A. Chekhov. Gooseberry). “A thousand sentient beings, closing their eyes forever rather than accept us” (S.Meyer. The Host). Examples show that in Russian, these physiological states denote sleep, whereas in English they can reflect death.

When studying proverbs and phraseological units in different structured languages, it can be concluded that the worldview changes depending on the difference in mentalities. Each ethnic group has its own mentality-based ability to perceive the real world. And this ability makes it possible to display the surrounding reality in different languages more vividly and expressively.

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人口健康是我们社会政府的一个例子
POPULATION HEALTH IS AN EXAMPLE OF OUR SOCIAL GOVERNMENT

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注解。 文章分析了国家政策的优先方向，即建立优质的医疗卫生体系，维护和改善我国人民的健康，为养育健康的一代人创造条件。

关键词：《乌兹别克斯坦-2030》战略、人口平均预期寿命、新机制。

Annotation. *The article analyzes the priority direction of the state policy of establishing a quality health care system that allows maintaining and improving the health of the population in our country, creating conditions for raising a healthy generation.*

Keywords: *«Uzbekistan - 2030» strategy, average life expectancy of the population, new mechanisms.*

Introduction

During the years of independence, positive changes and updates were made in all aspects of our country, and reforms aimed at ensuring the health of our people were implemented.

The noble principle of the head of our state that our people should see positive changes in their lives not tomorrow, not in the distant future, but right now, has been fully applied to all aspects of our life, and a wide path has been opened for positive changes in many areas, including the medical system.

Fundamental improvement of the health sector, provision of high-quality medical services to our people, strengthening of reproductive health of the population, protection of motherhood and childhood, creation of necessary conditions for the education of a healthy generation have been defined as one of the priorities of our state's policy, and unprecedented work has been done in this direction. The "Uzbekistan-2030" strategy has become an important program for consistently continuing the reforms implemented in all spheres in our country and raising them to a new level. In this document, which represents the stage of a new era, goals and tasks related to the health sector are reflected along with many directions.

The "Uzbekistan-2030" strategy includes increasing the average life expectancy of the population, bringing primary medical services closer together, increasing the effectiveness of prevention and treatment of hereditary diseases among children, early detection of oncological diseases and reducing the death rate, increasing the effectiveness of prevention of non-communicable diseases, and widespread use of digital technologies in the field of medicine. implementation issues are also set as a priority.

In particular, it is aimed to increase the average life expectancy of the population to 78 years by 2023. Also, the amount of funds allocated to medicine will be doubled. Such large investments serve to increase not only the health of our population, but also the medical culture.

Literature review

In the current period, it is being studied that the process of raising our youth to be mentally mature, physically healthy and strong, and strengthening the health of the population is one of the urgent tasks. In this regard, the scale of the work carried out on the scale of our republic is noteworthy. The President of our republic every year in recent years

With the initiative of Sh.M. Mirziyoev, the tradition of giving priority to a certain field, value or direction was established in our country. In the Address of the President of our Republic Sh.M. Mirziyoev to the Oliy Majlis, 2021 was announced as the "Year of supporting youth and strengthening public health"[1]. If we look at it in a broader sense, we see that the main goal of the priority given for each year is aimed at the development of a comprehensively developed person, the spiritual, moral and spiritual health of the young generation leading to humanity, and strengthening the health of the population. We believe that these should not be considered as just a set of activities, but a strategy for consistent problem solving should be studied.

If the teachings of one of our great ancestors - Abu Ali ibn Sina - are followed in the process of education, a certain contribution will be made to the development of the young generation as a person. In the scientific works left by the great scientist, we see that physically fit people have good development of independent thinking skills, can correctly assess the situation and act rationally without panicking in various dangerous situations. It is of great importance that the scientist emphasized that the young generation will be raised not only physically healthy, but also spiritually and morally, they will have the ability to think deeply and independently. From these information of the thinker, it is known that humanity shows that even by the 21st century, the teaching advanced 1000 years has not lost its relevance.

[1] Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis. - T.: - 29.12.2020. Ўзбекистон Республикаси Президенти https://president.uz › lists › view

A global health movement has been launched, according to which in many countries the process of doing sports has been raised to the level of a daily need. Based on the information given by M. Melieva, while 15% of the population of Finland and 40 million of the population of the USA are engaged in healthy running[2], we believe that our youth, who make up more than half of the population of our republic, and other sections of the population will also benefit from this.

Metodology

Human health is a generalization of his physical, mental, spiritual and moral characteristics, so he can continue working, live long and fulfill all plans. Health is a great gift for man and society. Only if a person is healthy, he can overcome all the dangers in life and achieve great achievements. A healthy lifestyle is expressed by how a person lives. In particular, it is based on his daily routine, diet and communication with people. In this sense, for the students of general education institutions, it is important to make a reasonable schedule of the day in accordance with their age (reading, writing, thinking, solving problems, listening to and preparing lessons, playing sports), that is, the correct distribution of mental and physical labor activities. Due to the well-planned agenda, students are prevented from getting bored, have a positive effect on their growth and development, as well as strengthening their immunity and allowing them to fully master all subjects planned in the curriculum of all subjects.

Analysis and results

It is planned to reduce premature death by 2.5 times in oncology, cardiovascular, diabetes and respiratory diseases. It is also planned to drastically reduce the incidence of tuberculosis from the current 34 per 100,000 population. In addition, it is planned to reach 100% digitization level of medical institutions within 7 years.

At this point, in order to attract the necessary funds for the purchase of equipment to continue reforms in this direction and improve the material and technical base of sanitary-epidemiological service institutions, to expand the capabilities of laboratories, between the Asian Development Bank and the Asian Infrastructure Investment Bank, 200 million US dollars were allocated between Uzbekistan and Uzbekistan. A loan agreement was signed in the amount of USD.

It is also noted in the content of paragraph 178 that the President's Decree PQ-5129 of May 27, 2021 "On measures to implement the project "Urgent measures against the infection of the coronavirus COVID-19 in the Republic of Uzbekistan"[3] with the participation of the Asian Development Bank and the Asian Infrastructure Investment Bank" No. decision was taken.

According to paragraph 180, 6.1 mln. children aged 2-10 were supplied with special preparations for the prevention of helminthiasis and deworming activities

[2] Melieva M. (2005). Fitness running. Magazine for a healthy generation, 9.

[3] PQ-5129 dated 05/27/2021. Asian Development Bank ...https://lex.uz › docs

were carried out. Vitamin A was supplied to 358,000 children in Andijan region and 137,000 children aged 6 months to 5 years in Jizzakh region. 440,000 packages of micronutrient powder were delivered and distributed to regions based on distribution.

Based on item 181, instead of the planned 224 children, 315 (141%) underwent operations using cochlear implants.

According to the order No. 328 of the Ministry of Health of December 9, 2020 "On the introduction of completely new mechanisms to the activity of primary medical and sanitary care institutions and improving the quality and efficiency of the patronage system", 14202 medical brigades were established, with 8214 doctors and 24326 nurses. was taught, it is said in paragraph 182.

As reflected in the content of paragraph 184, in order to gradually implement the system of providing medical services within the framework of the package guaranteed by the state with free medical services and medicines to the population, the Ministry of Health approved the guaranteed package of medical care covered from the state budget of the Republic of Uzbekistan on March 3, 2021. "Guaranteed package" was approved by order No. 47.[4]

Paragraph 186 of the document in order to ensure the implementation of the priority tasks set for the protection of public health, to create the necessary conditions for increasing the capacity of medical workers Presidential Decree No. PF-6221 of May 5, 2021 confirms that starting July 1, 2021, nursing is included in the list of activities that self-employed persons can engage in.

Bringing specialized medical services closer to the population,

26, 2021, in order to save the lives of citizens and restore their active working capacity due to the timely provision of emergency medical care, to provide children, women of childbearing age, pregnant and breastfeeding women with preventive special drugs free of charge, and to further improve the system of providing nephrology and hemodialysis care According to the decision PQ-5198 of July "On measures to further improve the quality of medical care provided to the population", 35 inter-district centers for joint injuries and acute vascular diseases will be established within the district (city) medical associations, it is stated in paragraph 191.

According to the content of paragraph 192, the action plan for establishing kidney transplant practice in Namangan, Samarkand and Khorezm regions was approved and a total of 12 kidney transplants were carried out as of 01.0.2021.

According to paragraph 196, 34,575 students of 47 technical schools of public health named after Abu Ali ibn Sina and 18,400 students of 28 medical colleges, depending on their specialty, will go to 22 specialized scientific and practical med-

[4] In the direction of strengthening the health of the population, social protection of the population and increasing the socio-political activity of women. 03.11.2021. https://strategy.uz/index.php?news=1408

ical centers of the republic, 2 research institutes and 12 was attached to the medical higher education institution.

Conclusions and suggestions

To conclude from the above, reforms in the field of education today are closely related to other fields with their relevance and practical importance.

After all, according to the words of the President, every field can develop only with scientific foundations. Therefore, the adoption of the "Uzbekistan-2030" strategy in view of educational prospects shows that it is the need of the hour to continue the reforms in this field on a larger scale.

In the "Uzbekistan-2030" strategy approved by the decree of the President of the Republic of Uzbekistan, a number of reforms to ensure the health of the population are defined.

In particular, it is aimed to increase the average life expectancy of the population to 78 years by 2023.

- bringing the primary medical-sanitary service closer to the population with maximum coverage;
- supporting a healthy lifestyle, healthy diet and physical activity of citizens, promoting them in all ways among the population;
- protection of motherhood and childhood, meeting the needs of the population in this regard;
- expanding the scope of specialized medical care;
- complete digitization of the health care system, putting an end to red tape, unreasonable bureaucracy and queues, creating convenience for the population when applying to medical institutions;
- introducing modern and effective management methods and improving the quality of medical services;
- increase the capacity of personnel, development of medical education and science;
- private sector development and investment attraction and implementation of large public-private partnership projects;
- strengthening the material and technical base of medical institutions;
- effective regulation of the pharmaceutical industry is an important and urgent priority.

According to the document, starting from January 1, 2024, treatment of patients infected with viral hepatitis «C» type, children with oncological diseases in need of hematopoietic bone marrow stem cell transplantation will be started at the expense of the State budget.

In addition, it is planned to gradually organize the work of providing disabled persons with prosthetic-orthopedic goods, rehabilitation and medicines on the basis of the «voucher» system. Persons with disabilities will be given the opportunity

to purchase goods and services from the supplier of their choice, and their costs will be covered from the State budget. All this serves to preserve the health of our compatriots and to support patients from the state.

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通识教育组织领导风格与教师冲突水平的关系

THE RELATIONSHIP BETWEEN THE LEADERSHIP STYLE OF A GENERAL EDUCATION ORGANIZATION AND THE CONFLICT LEVEL OF TEACHERS

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注解。 本文致力于研究通识教育组织的领导风格和教师的冲突性质问题。本文提出了一项研究，其目的是确定普通教育组织的领导风格与教师冲突水平之间的关系。 该研究的主题是普通教育组织的领导风格与教师冲突水平之间的关系。 为了实现这一目标，使用了以下方法："领导风格"方法（A.L. Zhuravleva）、"管理风格自我评估"测试（A.V. Agrashenkova，由 E.P. Ilyin 修改）、"冲突行为风格"方法（K. Thomas） ），人格冲突程度的评估（V.I. Andreev）。 进行了实证研究，对所得结果进行了呈现和分析，并得出了结论。

关键词：领导者、领导风格、冲突、教师、冲突。

Annotation. *The article is devoted to the problem of studying the leadership style of a general education organization and the conflict nature of teachers. The article presents a study the purpose of which was to identify the relationship between the leadership style of a general education organization and teachers' conflict levels. The subject of the study was the relationship between the leadership style of a general education organization and teachers' conflict levels. To achieve this goal, the following methods were used: Methodology "Leadership Style" (A.L. Zhuravleva), Test "Self-Assessment of Management Style" (A.V. Agrashenkova modified by E.P. Ilyin), Methodology "Style of Conflict Behavior" (K. Thomas), Assessment of the level of personality conflict (V.I. Andreev). An empirical study was conducted, the results obtained were presented and analyzed, and conclusions were formulated.*

Keywords: *leader, leadership style, conflict, teacher, conflict.*

Most specialties involve the joint work of people in one team, where conflict situations may arise due to personal or professional relationships. In our society, there has traditionally been a negative attitude towards disputes, but with proper management, conflicts can be beneficial, revealing problem areas in the organization's activities, improving relationships between employees by resolving mutual claims, etc. The intensity of disputes between employees, their direction, level emotional involvement and "destructive" consequences depend on many factors, including the leader and his preferred management style. Where a manager knows how to listen to his subordinates, understand the problem and resolve a controversial situation, conflicts arise less frequently and have a more likely positive effect. Pedagogical activity carries a certain social status, because teachers are not only a source of knowledge for students, but also an example for social imitation. Therefore, it seems important to us to study the relationship between the leadership style of a general education organization and the conflict levels of teachers.

A manager's style is a set of forms, methods and techniques that a manager uses to work with subordinates. There are three main leadership styles: authoritarian, democratic, liberal.

The theory of conflicts is developed in various branches of scientific knowledge: jurisprudence, political science, pedagogy, literature, sociology, psychology, cultural studies, programming. A conflict is a situation in which a person defends his own opinions, views that do not coincide with the opponent's views on the subject of the dispute. Interpersonal conflict is a sharp contradiction of a conscious or unconscious nature that arises between people in the process of social interaction, based on the existence of opposing, incompatible tendencies, motives, interests and types of behavior. Knowledge of the essence of the concept of "interpersonal conflict", its features, types and characteristic features allows one to develop positive skills for effective and constructive behavior in conflict, which will help improve the level of general culture and the spiritual and moral potential of the individual.

The works of domestic and foreign authors were devoted to theoretical studies of conflicts. Among them we can point out the theory of basic conflict by K. Horney, the typology of conflicts by K. Lewin, studies of the characteristics of conflict by L. Coser, four points of view on the causes of social conflict by A. G. Zdavomyslov, the ontological essence of conflicts by N. I. Leonov, studies of the substantive essence of conflicts S.V. Berezin, K.S. Lisetsky and M.E. Serebryakov and others [4].

In general, a conflict is "a collision of oppositely directed, mutually incompatible tendencies, a single episode in the mind, in interpersonal interactions or interpersonal relationships of individuals or groups of people, associated with negative emotional experiences" [3].

School conflicts are natural; they usually arise due to the inability to react to a variety of changed conditions, and conflicts are also widespread. There can be only one solution - you need to remember the humanistic values at school, first of all, trust, freedom and respect for each other [2].

The head of an educational institution may have several common characteristics, but the leadership style must switch to other styles from time to time according to the need of the organization and time [1].

The more styles a leader has mastered, the better. In particular, the ability to shift between authoritative, caring, democratic, and coaching styles as circumstances dictate creates the best organizational climate and optimizes performance.

We will begin our discussion of the results with an analysis of the data obtained when identifying and assessing the administration leadership style of school teachers in Irkutsk.

The results of testing teaching staff showed that 52.5% of teaching staff indicated that the leadership of an educational institution prefers a collegial (democratic) management style, characterized by an orientation towards the distribution of professional powers, initiative and responsibility between the manager and subordinates. Managers who prefer this style always focus on the team's opinion on important issues and involve subordinates in making collegial decisions. Communication with subordinates is friendly and polite in the form of requests, recommendations, and rewards for high-quality and promptly completed work. The interests of people are placed above the interests of the cause (but not to the detriment of the cause), the interests of subordinates are defended before senior management.

According to 12.5% of teaching staff, the management of the institution in which they carry out their professional activities is inclined to a liberal (permissive) management style. This management style is characterized by the lack of active participation of the manager in managing subordinates, the tendency to "go with the flow", avoidance of resolving urgent conflicts, the desire to reduce personal professional responsibility, and letting work take its course.

In turn, 35.0% of teaching staff noted that management does not have a clear management style.

It is significant that none of the surveyed teaching staff indicated that the organization's management has a predominant directive (authoritarian) style of personnel management, which is characterized by the manager's orientation toward sole decision-making and the exercise of strict (total) control, depriving subordinates of initiative.

Thus, we can draw the following conclusion: according to the assessments of the staff, the administration of a general education organization has a predominant collegial leadership style.

The results of the methodology "Assessment of management style", proposed by A. V. Agrashenkov and modified by E. P. Ilyin, showed the following: the majority of respondents in the administration of a general education organization give preference to a democratic management style, namely 47.5% have a medium and high level of democratic management style . It is worth noting that 55% of the respondents in the administration of a general education organization are characterized by an average level of liberal management style, however, a high level of democratic management style still remains dominant.

The results of the conducted methodology "Types of behavior in conflict", developed by K. Thomas and adapted by N.V. Grishina, obtained during diagnosis, characterize the following: the most preferable type of behavior in conflict situations for 45.0% of teaching staff is "compromise", which is based on lies an agreement based on mutual concessions that resolves the contradiction that has arisen.

For 42.5% of teaching staff, the most acceptable behavior in work conflicts is "cooperation", which is based on the search for options for resolving controversial issues that fully satisfy the interests of both conflicting parties.

7.5% of teaching staff were diagnosed with the "adaptation" type of behavior, i.e., in a controversial situation, they are ready to sacrifice their own interests for the sake of the interests of another in order to preserve relationships and their own peace of mind.

Finally, 5.0% of teaching staff in conflict situations that arise at work prefer the type of behavior "rivalry" (or "competition"), that is, they strive to achieve their interests even to the detriment of someone.

Thus, we can draw the following conclusion based on the methodology: teaching staff, in the event of work conflicts, tend to use effective behavioral strategies. In particular, they either tend to look for options that satisfy the interests of both sides of the conflict, or show a readiness to make mutual concessions that resolve the contradiction that has arisen.

The results of the methodology "Assessing the level of personality conflict" developed by V. I. Andreev, obtained when diagnosing teaching staff, showed the following: in the majority of teaching staff, they identified average (47.5%) and reduced (30.0%) levels of severity of the tendency to produce conflicts. In turn, 15.0% of teaching staff found increased and high levels of conflict, and 7.5% of teaching staff demonstrated an unpreparedness to enter into conflicts. Consequently, the majority of teaching staff at MBOU Secondary School No. 4 are not prone to increased conflict production.

In order to identify the relationship between the leadership style of a general education organization and the conflict levels of teachers, a correlation analysis was carried out using the Pearson method. The data obtained indicate that there are many relationships of varying directions and strengths between the indicators of

the methods. At the same time, the correlation galaxy is represented by one graph, in which indicators characterizing team management styles were conditionally identified as system-forming ones.

The indicator “collegial leadership style” formed one strong directly proportional relationship with the indicator “cooperation” (r = .686; p = .000) and two strong inverse relationships with the indicators “personal conflict” (r = -.642; p = .000) and “compromise” (r = -.432; p = .005). The same relationships (taking into account direction and strength) were formed by the indicator “democratic management style”. These relationships allowed us to draw the following conclusion: the more the head of an institution is focused on democracy in management, the less often conflicts arise in the team. Along with this, employees are less likely to find themselves in a situation where, in order to solve the tasks assigned to them and the institution, they have to sacrifice their interests, and the more they are focused on a joint search for options for resolving controversial issues.

The indicator “liberal leadership style” formed two strong directly proportional relationships with the indicators “compromise”

(r = .586; p = .000) and “conflict” (r = .749; p = .000), as well as one strong inverse relationship with the “cooperation” indicator (r = -.602; p = .000) . In turn, the indicator “liberal management style” formed identical relationships with the listed indicators. The listed relationships indicate that the lack of active participation of the manager in the management of the team, his self-removal increases the likelihood of conflict situations arising in the team due to the desire of employees to occupy the most advantageous position for themselves and reduces their readiness to collectively resolve controversial issues. At the same time, such behavior of the leader entails the need for subordinates to seek compromises in order to solve the tasks assigned to them and the institution.

The indicator “directive leadership style” formed a moderate, directly proportional relationship with the indicator “competition”

(r = .345; p = .029). The same relationship was formed with the indicator “competition” and the indicator “authoritarian management style” (r = .350; p = .027). From the identified relationships, we can draw the following conclusion: the more the head of an institution is focused on authoritarianism in management, the more severe confrontation is present in the team and the less team members are inclined to make concessions in a conflict situation.

Thus, based on the results of the correlation analysis, we can conclude that a high level of conflict in a team of teaching staff corresponds to the expressed permissive and authoritarian leadership styles of the administration of a general education organization, and low conflict in a team is interconnected with the preference of the management of a general education organization for a collegial (democratic) leadership style.

Thus, according to the assessments of the staff, the collegial style of leadership of a general education organization predominates. In the event of work conflicts, teaching staff tend to use effective behavioral strategies. In particular, they either tend to look for options that satisfy the interests of both sides of the conflict, or show a readiness to make mutual concessions that resolve the contradiction that has arisen. There is an inverse relationship between the style of team leadership and the conflict of its employees. Thus, a high level of conflict in a team of teaching staff corresponds to the expressed connivance and authoritarian leadership styles of the administration, and a low level of conflict in a team is interconnected with the preference of the management of a general education organization for a collegial (democratic) leadership style. Due to the fact that teachers are also characterized by a high level of conflict, as well as an unwillingness to enter into conflicts, it is necessary to develop recommendations in order to prevent conflicts in the teaching environment.

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周边地区发展战略背景下的跨境合作——以东北振兴为例
CROSS-BORDER COOPERATION IN THE CONTEXT OF THE DEVELOPMENT STRATEGY OF PERIPHERAL TERRITORIES: THE CASE OF REVIVAL OF NORTHEAST CHINA

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注解。 跨国界、跨界合作往往被视为促进有问题的周边地区发展的手段。然而，这一总体概念涵盖了各种政策和工具，这些政策和工具在不同背景和情况下所能实现的范围及其有效性有所不同。 在国家领导人实施的二十年来的东北振兴战略中，拓展跨境合作无一例外地被列入了一系列帮助实现其目标的举措中。这个问题的解决仍然是现代中国领导层面临的最严峻的挑战之一，从理论和实践的角度来看，解决这个问题的经验是一个非常有趣的案例。

关键词：中国、区域发展管理、周边地区、跨境合作、东北振兴战略。

Annotation. *Cross-border and cross-border cooperation is often seen as a means of promoting the development of problematic peripheral areas. However, this general concept covers a variety of policies and instruments that differ in the scope of what they can achieve and their effectiveness in different contexts and situations. In the strategy for the revival of Northeast China, implemented by the country's leadership for twenty years now, the expansion of cross-border cooperation has invariably been included in a set of measures to help achieve its goals. The experience of solving this problem, which remains one of the most serious challenges faced by the leadership of modern China, represents in this regard a very interesting case from a theoretical and practical point of view.*

Keywords: *China, regional development management, peripheral territories, cross-border cooperation, North-East revitalization strategy.*

"Northeast Revitalization" Strategy (zhenxing dongbei振兴 东北) as one of the key directions of the general state policy for managing the development of peripheral territories was launched by the central leadership of the PRC at the end of 2003[1]. Despite certain achievements, in general, according to the general opinion, its main goals - the formation of endogenous economic growth, restoration of the pace of economic development and the transformation of Northeast China into the "fourth pole" of the economy - have not only not been achieved, but have become increasingly difficult in recent years more ghostly[2]. In developing and implementing this strategy, the central government relied mainly on its own strengths and internal capabilities. Without denying in principle the opportunities associated with intensifying cross-border cooperation as a means of promoting the growth of the northeastern region, this, however, was viewed rather as an additional and not the most significant of the possible tools.

Among the twelve main activities for the "revival of the Northeast" identified by the CPC Central Committee and the State Council in 2003, "further expanding opening up to the outside world and the internal world" was mentioned as the ninth point. The need for this was associated with attracting foreign direct investment for the "restructuring of state-owned enterprises" and "transformation of old industrial bases." "The Northeast region should use its proximity to Russia, Japan, South Korea, North Korea and others to strengthen cooperation," the document emphasized, taking full advantage of existing port conditions and advantages in Northeast Asia[3]. In 2007, analyzing the progress of the implementation of the plan for the revival of the North-East, the formation of an "open structure with coastal and border regions and large cities in the North-East as key objects" was already named among the important achievements, opening up additional potential opportunities for the development of the region. At the same time, the need for further expansion of foreign trade and better use of foreign investment was emphasized[4]. Both were considered in the context of "import substitution", a policy

[1] 中共中央国于实施东北地区等老工业基地振兴战略的若干意见//中发〔2003〕eleven号= Some opinions of the Central Committee of the Communist Party of China and the State Council on the implementation of the strategy for reviving the northeastern and other old industrial bases // Zhongfa [2003] No. 11. URL:https://www.waizi.org.cn/file/83726.html. Request date 10.12. 2023

[2] 东北屡振不兴，问题出在哪里？//腾讯新闻 于2023-10-16 = Northeast China has repeatedly failed to revive. What is the problem? // Tencent News. October 16, 2023 URL:https://www.wenxuecity.com/news/2023/10/16/125229250.html. Request date 03.10. 2023

[3] 中共中央国于实施东北地区等老工业基地振兴战略的若干意见//中发〔2003〕eleven号= Some opinions of the Central Committee of the Communist Party of China and the State Council on the implementation of the strategy for reviving the northeastern and other old industrial bases // Zhongfa [2003] No. 11. URL:https://www.waizi.org.cn/file/83726.html. Request date 10.12. 2023

[4] "Plan of Revitalizing Northeast China" Released // China Daily. 20.12. 2007. URL:https://www.chinadaily.com.cn/business/2007-12/20/content_6336092.htm. Request date 15.10. 2020.

to limit the import of products and attract foreign companies to create joint ventures to produce such imports that would be beneficial to the region[5].

In the next document on the implementation of the strategy for revitalizing Northeast China and other old industrial bases, issued by the State Council in September 2009, the idea of the need to accelerate the dynamics of opening up the northeastern regions of the country and intensify foreign trade relations with Northeast Asian countries was expressed much more clearly. It spoke of the Chinese government's readiness to take new steps to develop the northeast of the country, including the construction of a comprehensive duty-free zone in Suifenhe, expanding the external relations of the cities of Changchun, Jilin and Tumenjiang with the outside world and promoting the development of the coastal economic zone of Liaoning Province. In November 2016, the National Development and Reform Commission came out with new Guidelines containing 14 new steps aimed at revitalizing the northeast region. Among them, along with pilot reforms of mixed ownership in state-owned enterprises and the implementation of the "Made in China 2025" industrial transformation plan, the construction of a new free trade zone (FTZ) in Dalian, a port city in Liaoning province overlooking South Korea and Japan, was mentioned. . Unlike other similar initiatives, this zone focused on major pilot reforms to increase the cross-border flow of human resources, goods, information and capital, allowing the northeast to improve its market economy system[6].

Despite numerous references to the importance of increased external openness and increased cross-border interactions as incentives for sustainable development of the Northeast in these and subsequent documents, the region, even today, is often characterized as an "isolated island", separated from the world by the barrier of North Korea and Russia. In 2022, the three northeastern provinces' trade dependence was only 19%, far below the national level of 34%. In terms of total foreign investment attracted in 2020, the three northeastern provinces lagged significantly behind most other regions of the country. Their external economic connectivity is not only lower than that of the coastal regions, but also lower than that of many provinces in the central and western regions that are not on the border or have access to the sea[7]. The limited success in expanding the openness of the Northeast and, as a consequence, the modest contribution of cross-border

[5] Li Fangchao. Plan to Revitalize Northeast Region //https://www.chinadaily.com.cn/china/2007-08/09/content_6018172.htm. Date of access: 13.09. 2020.

[6] Li Nan. Buffing the Northeast. New Moves Seek to Spur Economic Vigor // Beijing Review. No. 49. December 8, 2016. URL:http://www.bjreview.com/Business/201612/t20161205_800073888.html. Date of access: 15.09. 2021.

[7] 东北屡振不兴，问题出在哪里？//腾讯新闻 于2023-10-16 = Northeast China has repeatedly failed to revive. What is the problem? // Tencent News. October 16, 2023 URL:https://www.wenxuecity.com/news/2023/10/16/125229250.html. Request date 03.10. 2023

cooperation to its development is associated by many Chinese experts with the objective complexity of the international environment of Northeast Asia. Being in a complex geographical environment, its ups and downs were largely determined by the political and economic changes taking place there. In the late 19th and early 20th centuries, it was able to emerge as the fastest growing region in the country, benefiting from short-term economic integration and a climate of liberalization in Northeast Asia. But after the Korean War, the geopolitical situation deteriorated sharply: the split of the Korean Peninsula severed its economic ties with South Korea and Japan for a long time; the loss of maritime rights to the Heilongjiang and Tumen rivers, which China initially enjoyed by law, deprived its northeastern provinces of convenient access to the sea; The increasingly frequent nuclear tests of the DPRK, as well as the intensification of competition between China, Russia, the United States, Japan and South Korea in Northeast Asia at the beginning of the 21st century, have further complicated the external environment of Northeast China. Although it has the opportunity to develop trade ties with North Korea and the Russian Far East, due to the gradual impoverishment and internal isolation of their economies, the scope of economic and trade interactions remains limited[8].

However, in recent years, the Chinese leadership has been increasingly and persistently turning to the idea of expanding the involvement of Northeast China in cross-border interactions as one of the tools for economic and social revitalization of the region. In October 2023, a meeting of the Politburo of the CPC Central Committee emphasized the need to strengthen infrastructure planning and construction in border areas, realizing their unique location advantages and enormous development potential.[9]. The process of transforming location advantages into open advantages has been noted to continue to accelerate, allowing Northeast China to easily interact with neighboring countries and regions through economic and trade cooperation and exchanges. Thanks to this, at the beginning of 2023, the total import and export volume of Liaoning, Jilin and Heilongjiang provinces increased by 4.5% year on year, 2.4 percentage points above the national level. The construction of various foreign cooperation platforms has accelerated. The systems of the Liaoning Pilot Free Trade Zone and the Heilongjiang Pilot Free Trade Zone are being improved. New national level zones open in Changchun, Dalian and Harbin[10].

[8] Right there.

[9] 中共中央政治局召开会议 《关于进一步推动新时代东北全面振兴取得新突破若干政策措施的意见》.中共中央总书记习近平主持会议//新华社. 2023-10-27. = The Politburo of the CPC Central Committee held a meeting to review "Opinions on a number of policies and measures to further promote the comprehensive revival of Northeast China in a new era and achieve new breakthroughs." The meeting was chaired by the General Secretary of the CPC Central Committee Xi Jinping // Xinhua News Agency. 27.10. 2023. URL:https://www.gov.cn/yaowen/liebiao/202310/content_6912399.htm. Request date 03.10. 2023

[10] Right there.

At the late 2023 Symposium on Promoting the Comprehensive Revitalization of Northeast China in a New Era, General Secretary Xi Jinping also emphasized the importance of accelerating the construction of modern infrastructure, enhancing the level of internal and external openness and cooperation, and making the Northeast region an important hub for cross-border cooperation, deeply integrated into the nationwide Belt and Road Initiative. The new era, as noted in his speech, opens up new opportunities for the comprehensive revitalization of Northeast China, relying, among other things, on expanding regional cooperation in Northeast Asia[11]. More favorable prospects for this arise as a result of Russia's obvious reorientation to the east in the context of sanctions pressure from the West, strengthening mutual interest and facilitating coordination of efforts.

However, as various comments by Chinese analysts have noted, some challenges remain that limit the development of cross-border interactions with China's neighbors in Northeast Asia. In particular, some have noted that both Russia and North Korea have been reluctant to embrace economic integration and trade liberalization, concerned about China's growing power and advantages. At the same time, it is sometimes overlooked that this may also be facilitated by new nuances in the interpretation of regional cooperation, which are increasingly noticeable in the speeches of Chinese officials. Thus, back in 2018, determining the direction of development of Northeast China, General Secretary of the CPC Central Committee Xi Jinping emphasized the important mission assigned to the region to ensure the country's "five main areas of security" - national defense security, food, environmental, energy and industrial security - within the framework of the general situation of national development[12]. At the already mentioned meeting of the CPC Central Committee in October 2023, it was noted that the profound changes in the international landscape, the entry of the world into a new period of turbulence, the rise of uncertainty and unpredictability require balancing the relationship between high-level opening up and national economic security, comprehensively improving the ability to coordinate the expansion of opening up and economic security in the process of comprehensive revitalization of Northeast China in a new era.

Cross-border and cross-border cooperation is traditionally considered as one of the possible tools that contribute to the rise and development of problematic peripheral territories. In the strategy for the revival of Northeast China, implemented by the country's leadership for twenty years now, it has also invariably been included in a set of measures to help achieve its goals. However, both efforts to in-

[11] 以高水平开放谋划东北振兴新篇章//中国社会科学报. 2023年12月12日= Planning a new chapter for the revival of Northeast China with high-level opening // Chinese Journal of Social Sciences. December 12, 2023 URL:https://www.dufe.edu.cn/content_80130.html. Date of access 03.01. 2024

[12] 东北全面振兴，总书记布局一盘大棋//新华社新闻2023-09-12 = Secretary-General outlines a big game for the comprehensive revival of Northeast China // Xinhua News Agency. 12.09. 2023. URL:https://new.qq.com/rain/a/20230912A0ANVE00

crease openness and cross-border cooperation, and the results of the revitalization of the Northeast region, are still far from expected. A number of Chinese experts attribute this to the complexity of the international environment in Northeast Asia, which objectively limits cooperation between neighboring countries and regions, as well as the fears and prejudices that divide them. However, in recent years, the emphasis on developing regional cooperation as a means of injecting new dynamics into the Chinese Northeast has increased, while adding new nuances that emphasize the need to maintain a balance between openness to the outside world and national security.

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地名的文化特征
CULTUROLOGICAL CHARACTERISTICS OF TOPONYM

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抽象的。 本文探讨了地名的文化特征。 这项工作的目的是从语言文化学的角度研究地名并识别地名单元的主要文化特征。 为了实现这一目标，对本文主题的理论材料进行了分析。 在研究过程中，作者分析了地名的文化成分并研究了其文化潜力。 研究的结果是，作者识别了地名文化和历史内容之间的相关性，识别了专名空间与特定地区文化的联系，并根据识别出的地名文化特征，编制了文化学地名的特点。

关键词：地名、文化、文化学、语言文化学、地名、专名空间。

Abstract. *The article deals with the cultural features of toponym. The purpose of this work is to study toponyms from a linguoculturological point of view and identify the main cultural features of toponymic units. To achieve this goal, an analysis of theoretical material on the topic of the article was carried out. During the study, the authors analyzed the cultural component of toponym and studied its cultural potential. As a result of the study, the authors identified the correlation between cultural and historical contents of toponym, identified the connection of the onomastic space with the culture of a particular region, and also, based on the identified cultural characteristics of geographical names, compiled culturological characteristics of toponym.*

Keywords: *toponym, culture, culturology, linguoculturology, geographical names, onomastic space.*

In recent years, modern toponymy has made great progress, largely due to the study of Chinese toponyms. The progress achieved has led to results that stand out

especially clearly in scientific circles. However, considering toponymy as a full-fledged scientific system, we can argue that this system is formless in relation to recent toponymic studies, which indicates difficulties in the research of not only Chinese scholars, but also Russian ones. Thus, a focus on organizing further research and its subsequent systematization is necessary for the future development of toponymy in Russia and China.

To solve these problems, scholars turned to scientific works on the history of naming geographical objects and traditional toponymy. All studies clearly show connection of toponym and culture of its birth. This fact is a clear indication that there are linguocultural features which require more detailed study. Toponyms have great cultural potential and, of course, need to be studied.

Before we begin to identify the cultural features of toponyms, we consider it necessary to note the lexicological works of Alexandra V. Superanskaya, who studied toponymic units within the framework of onomastics and toponymy in general [4, 5], as well as the ethnolinguistic approach, which is widely represented in the works of Nikita I. Tolstoy and Alexander. S. Gerd [2,6,7], and the linguoculturological approach, which is reflected in the works of Evgeny M. Vereshchagin and Vitaly G. Kostomarov [1].

We also should mention a leading international trend in the study of place names. The international scientific community focuses its research on the consideration of political, functional and identificational (related to people's identity) aspects of toponymy. Thus, all major toponymic studies will necessarily affect the process of emergence and evolution of toponyms, the study of the relationship between the toponymic and linguistic landscapes of toponyms, the influence of historical, cultural, social and other factors.

One of the striking cultural features of toponyms is their cultural affiliation with a specific geographical area. Toponym conveys cultural extralinguistic information and, at the same time, limits access to this information for people who do not have the background knowledge contained in the vocabulary. Speaking about the figurative nomination of toponym, we should note the historical fixation of an image associated with a specific geographical place in the minds of people.

The cultural component of toponyms is deeply studied within the framework of linguoculturology, the task of which is to study the interaction between language and culture, identifying specific units of language that are semantically distinguished by the presence of Russian cultural elements in the language. Thus, we can agree with the fact of deep interest of linguoculturology in the study of toponymic units. Toponym exists at the levels of culture and language of the communicative space that is connected with linguistic personality, combines linguistic and extralinguistic plans, and also contains the whole variety of regional and cultural information about a specific geographical object.

For a deeper consideration of the cultural characteristics of toponym, it is necessary to resort to a cultural analysis of toponyms. Any name of a geographical object contains the entire history of a country or nation; it depicts different stages of cultural and social development. A person turns to the world around them, selects elements of reality that correlate with their background knowledge about this reality, and consolidates their understanding in the name of an object.

Thus, speaking about toponyms of a certain region, we can talk about onomastic space, which is formed from toponyms belonging to a given region. The term "onomastic space" is primarily considered as "the sum of proper names that are used to name real, hypothetical, and fantastic objects"[3].

Onomastic space is distinguished by a clear dependence on a specific culture, historical era and region, and its constituent toponyms retain all the significant cultural information of the ethnic group living in a certain territory. A toponym may appear as a result of a number of historical, economic or political changes within a particular society, and then store cultural and historical information about the era of its birth and transmit this information from generation to generation, which is one of the distinctive linguocultural features of toponyms. Toponyms store and transmit information about the culture of an individual people, their way of life and customs.

Speaking about the cultural characteristics, one cannot fail to note the reflection of nation's worldviews in toponyms. Any nation is characterized by feeling, rational and logical comprehension, contemplation and assessment of the surrounding reality, reflected in the name of the geographical object and, therefore, playing an important role in the cultural and philosophical perception of the life of nation in general.

Another linguocultural feature of toponyms is their national flavor. Obviously, the relationship between a geographical name and a geographical object is complex, and any geographical object receives a name that passes through the cultural prism of the individual, connecting it with a certain image of consciousness. Thus, it can be argued that any onomastic space depends on the model of the world, which exists in the minds of people living in a specific territory and is amenable to change at different periods of time.

Geographical names are considered as units of natural language, containing certain cultural semantics and performing the function of expressing cultural signs, demonstrating cultural and historical connections. It has been established that understanding and acceptance of linguistic patterns, background knowledge about culture, as well as the national and cultural characteristics of native speakers contributes to successful intercultural and interlinguistic communication. Thus, toponyms represent an important element of the cultural and philosophical perception of people, since they contain the historical and social experience of nation, information about the culture of people is stored and transmitted.

Thus, turning to the cultural features of toponymic units and studying them contributes to a deeper understanding of the relationship between toponyms and the cultural code of people, an understanding of semantic meanings and background cultural information. Toponyms have great cultural potential; they have a clearly defined cultural affiliation and record, preserve and transmit extralinguistic information about a named geographical object. Toponym depends on a historical era, stages of development of society, characteristics of the designated territory, as well as on national ideas and perception. Toponymic units contain a large toponymic cultural diversity, which goes back to the established cultural traditions and way of life of people, the economic and political situation of the country.

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受人为干扰地区的植物监测概念
PHYTOMONITORING CONCEPT FOR ANTHROPOGENICALLY DISTURBED REGIONS

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抽象的。 介绍了将植物监测理解为工业地区和自然系统高度转型地区的科学方向的概念程序和术语特征。 总结了植物指标特性的可能用途的方法、理论和实践方法，使它们成为有关顿巴斯以及世界其他工业地区自然环境状况的信息来源。

关键词：环境监测、顿巴斯、生态系统转型、植物监测、污染评估、工业区、植物检验技术、顿涅茨克地区、植物指示、生态分析、植物生存策略。

Abstract. *The conceptual program and terminological features in the understanding of phytomonitoring as a scientific direction in industrial regions and territories with a high degree of transformation of natural systems are presented. Methodological, theoretical and practical approaches are summarized for the possible use of indicator properties of plants in such a way that they are an informative source of information about the state of the natural environments of Donbass, as well as other industrial regions around the world.*

Keywords: *environmental monitoring, Donbass, ecosystem transformation, phytomonitoring, pollution assessment, industrial regions, botanical examination technologies, Donetsk region, phytoindication, ecological analysis, plant survival strategies.*

Currently, the dialectical approach to solving theoretical and applied problems of phytomonitoring remains relevant [1–3]. The system for developing the methodology includes a multifunctional choice when using the indicator properties of

plant organisms located in conditions of anthropogenic transformation of landscapes and natural environments in contact with plants – soil, air and water as an option for solutions in the root layer of soil [1, 4–7]. The search and establishment of the indicator significance of an individual structural feature or a population-level feature characteristic of the entire species or its coenotic availability in the analysis is the result of the use of development mechanisms, which generally corresponds to the general theoretical principles of the organization of living matter [4, 8–11].

In practical application, phytomonitoring, using the example of scientific developments in the Donbass, was formed on the basis of data on phytoindication and botanical diagnostics of the state of disturbed (anthropogenically transformed) ecotopes [12–14], including as one of the applied areas of industrial botany [9, 15–18]. In conditions of a geochemically and geophysically contrasting environment, caused by its deep artificial transformation, plants are unique sensors, based on the specific reactions of which it is possible to establish individual characteristics that have weighting coefficients for environmental monitoring [1, 3, 19–23]. These functional connections in the «environment – plant organism – information» system empirically confirm the basic dialectical laws about the unity and struggle of opposites – «factor – response», about quantitative changes in the transition to qualitative descriptive characteristics – phytoquantification, which is also associated with reverse processes obtaining data from collective characteristics and different levels of the dialectical spiral.

Methods and methods were used for collecting plant material and interpreting the data obtained. The term phytomonitoring, introduced into practice, was also taken into account both in physiological studies and in the practice of industrial design. In a methodological sense, it is important for the territory of Donbass to participate in established scientific schools and developments, in particular in industrial botany. The target program for organizing phytoindication studies and collecting phytomonitoring data in the region has been carried out for more than 25 years, has a number of features and fundamentally important technologies for solving practice-oriented problem situations, which also consider the methodological aspects of fundamental theoretical approaches and results obtained empirically from data. The main principle in carrying out open landscape experiments was to isolate the marker properties of plant organisms against the background of many environmental factors, to work in the «experience-control» system to establish reliable differences and differences in the structure and functions of test systems, which can subsequently be considered indicator significant.

It has been established that the main fundamental characteristic of phytomonitoring used in the work as a scientific and practical direction of ecological and biological research is the object-subject orientation of experiments: all implement-

ed programs are aimed at obtaining information about the state of environmental objects – biotopes, ecotopes, natural-territorial complexes of different dimensions or landscape systems. The subject in such procedures is an instrumental base or a set of analytical control devices, which makes it possible to establish the difference in the structural and functional characteristics of a plant organism, or group of organisms, to interpret the state of not the indicator, but the indicate. This feature makes it possible to implement full-scale environmental monitoring programs over large areas and, as a research product, to have cartographic material used in further measures to optimize and control the state of natural environments that have been subject to undesirable anthropogenic impact. Such phytomonitoring is fundamentally different from that introduced into the practice of agrophysical research and allows one to operate with large amounts of data when searching for the most informative criterion in the diagnosis of altered open geosystems. The totality of the studies presented made it possible to summarize the characteristics of phytomonitoring implemented in the Donbass in blocks of the knowledge-intensive structure of this area.

Methodological approaches (mainly dialectical) were partially analyzed in previous publications, and the principles and properties of phytomonitoring of anthropogenic transformations were also described using specific examples. Important in the experimental generalization is the proof of the material (material-energy) unity of natural-technogenic systems, taking into account their desire for balance and high self-healing ability. In practice, when developing optimization recommendations, this criterion has proven its effectiveness when it is necessary to take into account the system of adjacent connections already existing in a specific macroclimatic zone that direct an ecologically unbalanced set of natural components to stabilization. And in this case, the task of optimization measures should be focused on the fullest possible preservation of already existing endogenous constructs, for example, a seed bank in the soils of adjacent territories, existing foci of primary succession or ecesis, starting from the zero moment. Informative data in this aspect is information about the implementation or change of life strategies by individual species in specific conditions, when experimentation at the initial stages of self-overgrowth is replaced by stress tolerance of the same species in subsequent years, which allows you to effectively use first the resource of the territory, and only then the mineral raw materials bases in a specific place of growth.

Identifying the full variety of manifestations of internal and external factors in the process of phytomonitoring and establishing functional dependencies between them is a valid method for assessing the current state and forecasting the development of ecosystems, and therefore requires a long-term experiment and the competent implementation of methods for statistical processing of data sets. Plants used for environmental monitoring (taxa with basic species, structural char-

acteristics at the autophytoindicative level, synphytoindicative data, etc.) have a number of advantages in comparison with representatives of other systematic groups of biota, primarily due to their attachment to specific geolocality during the growing season.

Using the results directly on field stress, phytoindicative environmental monitoring, bibliographic accounting, diagnostics of pollution factors and based on data on structural polymorphism of plants, survival strategies and application of these knowledge in educational activities, at the present stage, programs are being implemented to study water bodies, urbanized natural-territorial systems, the air environment, geochemical activity of landscapes, and plant resistance to extreme factors as applied to large populated areas .

Methodologically justified for the current situation in the Donbass is the combination of methods for implementing a field (open) experiment for landscapes with a fractional multifactorial biotesting system in the laboratory and office processing of field collections, which also requires the use of a gradation procedure, quantification – in a gradient of stress factors in such a way that the state of plant organisms were assessed in quantitative terms according to their belonging to a certain range of factor values: limiting, or several that perform the function of transforming limiters).

Materials from primary succession processes are important for the development of a systematic and targeted process for optimizing the territory and minimizing unfavorable emissions into the environment, since the involvement of particularly toxic compounds and individual elements in the composition of metal dust represents a more serious environmental problem than in the composition of plants.

A demonstration model of field stress can demonstrably outline the line of contact of militarization processes (if one exists) or diagnose the foci of individual effects of field stress - this is in a certain way contrasted with cartographic visualization, in which ranked rows in dynamics can significantly differentiate the territory of unfavorable factors for normal functioning of phytosystems. Under such conditions, all life processes are realized: all stages of ontogenesis occur, cenopopulation differentiation can be observed as the initial stages of speciation in evolutionarily dynamic scenarios.

For ranked series, which in numerical equivalent are most adequately calculated into 5-7 ranges, it is important to highlight the voltage vector in such a way as to understand how much the visualization process on the map coincides with real processes in open systems.

Such monitoring studies are associated with a risk factor for the researcher himself and create the costs of a harmful production factor. Therefore, in the programs being implemented, it is important to develop such approaches to collecting

material in order to maximally protect the laboratory and (or) technical employee while at the recording sites and in contact with chemically aggressive environments.

Phytomonitoring systems are structured in a broad sense as components of nature and in a narrow sense as carriers of indicator microstructures that manifest themselves in specific conditions or sudden changes in individual environmental factors. Of the listed properties, questions of microevolutionary transformations arise in the long term when assessing, for example, individual metal-resistant cenopopulations of wild species of the weed-ruderal fraction of the flora of the region.

When processing data, numerical indicators are important for statistical accounting in different equivalents and accounting methods, which, with multivariate correlation analysis, can give a value that was not previously identified during simple field observation, which will expand the capabilities of the phytoindicative method for assessing the state of natural environments.

To analyze the survey sites, simultaneous collection and photography of both plant objects and sampling of the edaphic environment in the root layer is carried out (if it is possible to implement such an experiment). The detected phytotoxicity of soils (substrates) is, of course, an integral indicator, sometimes even more informative than the most detailed ingredient analysis for a sample, since indication of the reaction of a living component of the environment to a neo-environment-forming factor of an aggressive composition is a more important characteristic from the standpoint of survival under stressful conditions. For Donbass, at the present stage, a large-scale experiment is being implemented on survival, the development of new adaptive reactions in order to preserve genetic potential and the ability to pass it on by inheritance.

Thus, with a detailed ecological analysis, the field stress factor forms foci and (or) zones of phytoindicative inhibition – open experimental sites for the development of mechanisms of resistance to stress factors of a neogenic nature.

By adding the term element monitoring to the phytocomponents in the system of environmental control and processing data on the state of the environment, it becomes possible to implement differentiated programs: at different levels, in different functional states and for different purposes. In this case, each of the listed monitoring is primary and fundamentally important; and their arrangement in the figure does not take into account priority. Pre-project phytomonitoring is not completed at the commissioning stage, since it is considered as having data on the background state of the object before the start of economic activity; the background one is also considered in the aspect of the initial state and the general value of indicators in a remote accounting site, for example, an object of a natural reserve fund, where the influence of the factor that is assessed or is the cause of

the imbalance in the system quantified by risk is not registered. Moreover, quantification in this case has a multidirectional vector: when obtaining an integral characteristic of the environment or a differentiated fractional approach for a separate factor or its value. Problematic phytomonitoring in practice is carried out due to sharply diagnosed processes recorded as a result of field diagnostics, for example, the leakage of particularly toxic substances from underground storage facilities or communications is the cause of inhibition of the growth and development of especially sensitive elements of the cenosis, which makes it possible to identify unfavorable or dangerous situation. A similar example is considered in practice when investigating the causes of volleys of unauthorized emissions (or discharges) of particularly toxic substances by polluting enterprises. Contrasting and problematic phytomonitoring is also often initiated when there are organoleptic signals (from local residents) about a disturbance in the system that poses a threat to its full functioning.

If a biocomponent is added to monitoring programs, then we are talking about a set of reactions indicating a functional change that is significant for life processes. If we separately highlight environmental monitoring programs, then, as a rule, the task is to establish cause-and-effect relationships. Technological monitoring is necessarily instrumental, but in this context we can talk not only about instrumentation and measuring equipment, but also about the method of calculation or manipulation to inform the population or competent authorities, as well as documenting an unfavorable situation, or confirming a favorable situation in the absence of evidence of impact forms of violations. In the tested systems of the old industrial region, the product of phytomonitoring is an expert opinion or other permitting documents on the continuation and (or) cessation of existing forms of impact on natural systems, which may be the reason for the use of penitentiary measures to resolve the situation.

As both a fundamental and applied scientific focus, the system for identifying structural anomalies (terates) is highlighted, which finds its application in some issues of geochemically contrasting provinces, including those of neo-anthropogenic origin as a result of the protracted military conflict in the Donbass since 2014. Teratomorphs in their quantitative accounting reliably increase the level of general heterogeneity in the structure of plant material under the condition of unfavorable exposure factors. Such statistical data were used in the phytoquantification and monitoring experiment. The conducted research proves the presence in the Donbass of two current multidirectional trends in local anthropogenic pressure: 1) a negative process of increasing teratogenic polymorphism of plants along the transect of military confrontation; 2) the effect of recurrent optimization of indicator signs of structural and functional content in conditions of temporary freezing or stagnation of the work of industrial enterprises. Therefore, from the point of view

of phytomonitoring, the entire region is a testing platform for testing the stability of living components of natural environments and developing new adaptive capabilities under conditions of nonspecific stress (field stress).

In the phytoindication experiment (using the example of technogenic ecotopes of Donbass), 164 species of flowering plants and 68 species of bryophytes are currently involved, however, in the analysis of taxon-specific integration, only those families that have at least 10 signs of discrete structural heterogeneity were taken into account – 22 families.

Based on the botanical and ecological work carried out (1996-2023) in the Donetsk economic region, there is a need to formulate the term and concept of «phytomonitoring» with a recommendation for its further use in scientific publications. Phytomonitoring is an established scientific direction in biological science that establishes cause-and-effect relationships in the plant-environment system in the spatiotemporal dimension; is characterized by a differentiated approach to the objects of research and an integral assessment of the obtained scientific results.

Phytomonitoring allows you to solve theoretical and applied problems at various levels: from molecular to ecosystem, and has a number of prospects in accordance with technological trends.

Only the study of the entire complex of factors – natural, anthropogenic, in particular geographical, botanical, chemical, edaphic, etc. makes it possible, based on a comprehensive identification of dependencies in the plant-environment system, to predict the effectiveness of phytomonitoring.

Based on the ecological and botanical studies conducted over the past decades in the analysis of anthropogenically transformed ecosystems, there is a need to formulate the term and concept of phytomonitoring with a recommendation for its further use in scientific publications.

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CIRCADIAN RHYTHM OF OXYGEN SATURATION IN ACUTE RENAL FAILURE IN CHILDREN AGED 7.1-18 YEARS OLD

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抽象的。 在所有处于少尿症、急性肾衰竭阶段的儿童中，无论病情严重程度如何，氧饱和度读数都在可接受的值内，持续吹入浓度为 40-70% 的氧气-空气混合物。 氧饱和度指标昼夜节律的顶相值、幅度和日范围在较严重的患者中呈小幅上升趋势。 我们注意到第 3 组儿童的氧饱和度指标的平均昼夜节律水平相对较高，而第 1 组和第 2 组儿童的平均昼夜节律水平略低，这与体重较重的儿童使用更浓的氧气-空气混合物吹入有关。 机械通气。 第 1 组（有自主呼吸）的指标值相对稍高是由于呼吸系统的状态比第 2 组和第 3 组更有利。所发现的病情严重程度对氧饱和度影响的特征 指标证实需要更有效的抗炎治疗，开发方法以改善第 2 组和第 3 组儿童中伴有支气管肺炎的肺泡毛细血管膜的氧渗透性。基础疾病的严重程度产生了负面影响，平衡了代偿性 血流动力学在身体适应极端生存条件过程中的功能。

关键词：昼夜节律，血氧饱和度，急性肾功能衰竭，儿童。

Abstract. *In all groups of children in the stage of oligoanuria, acute renal failure, oxygen saturation readings were within acceptable values, regardless of the severity of the condition, with constant insufflation of the oxygen-air*

mixture at a concentration of 40-70%. The acrophase value, amplitude and daily range of the circadian rhythm of the oxygen saturation indicator showed a slight upward trend in more severe patients. We noticed a relatively higher level of the average circadian rhythm of the oxygen saturation indicator in group 3, slightly less in groups 1 and 2 of children, which was associated with the use of insufflation of a more concentrated oxygen-air mixture in heavier children on mechanical ventilation. The relatively slightly higher values of the indicator in group 1 (with spontaneous breathing) are due to a more favorable state of the respiratory system than in groups 2 and 3. The discovered features of the influence of the severity of the condition on the oxygen saturation indicator confirm the need for more effective anti-inflammatory therapy, the development of methods to improve the oxygen permeability of the alveolocapillary membrane with concomitant bronchopneumonia in children of groups 2 and 3. The severity of the underlying disease had a negative impact, leveling the compensatory functions of hemodynamics in the process of adaptation of the body to extreme conditions of existence.

Keywords: *circadian rhythm, oxygen saturation, acute renal failure, children.*

Relevance. Considering the leading importance of external respiration in ensuring adaptive changes in the homeostasis systems of children's bodies, the study, development, and improvement of intensive care methods, including infusion therapy, is one of the leading tasks of intensive care for critical conditions, including those caused by acute renal failure. One of the objective indicators of the adequacy of pulmonary ventilation is the oxygen saturation indicator. Depending on the causes of development, pathological processes in acute renal failure are caused by different mechanisms: ischemia of the renal parenchyma, activation of shunts in the juxtamedullary zone, toxic damage to the glomeruli and tubular epithelium, acute obstruction of the urinary tract. Oligoanuria develops as a result of the progression of the following pathophysiological processes: tubulonecrosis, persistent spasm of afferent vessels, tubular obstruction, primary damage to the tubular epithelium and reabsorption of the filtrate, decreased permeability of the capillary glomeruli. An increase in fluid volume during acute renal failure is accompanied by an increase in body weight, accumulation of intravascular fluid in the vascular bed, a decrease in its osmolarity, water begins to enter the interstitial space and accumulate in the tissues. Due to the increased load on the heart, the development of symptoms of heart failure, the appearance of edema, and the accumulation of fluid in the cavities, the question of the appropriateness of infusion therapy in conditions of oligoanuria remains debatable [1-5]. In light of the above, we made an attempt to study and assess the change in the circadian rhythm of

oxygen saturation in the phase of oligoanuria in acute renal failure at the age of 7.1-18 years.

Goal of the work. To study the features of the circadian rhythm of the oxygen saturation indicator in acute renal failure at the age of 7.1-18 years.

Material and research methods. Data from hourly monitoring of oxygen saturation and hemodynamic parameters were studied in 20 children with acute renal failure who were admitted to the ICU of the Russian Research Center for Emergency Medicine in the phase of oligoanuria at the age of 7.1 to 18 years. Before admission to the clinic, all patients received anti-inflammatory therapy aimed at treating pneumonia, acute glomerulonephritis, acute intestinal infections, acute respiratory infections, and HUS. Due to severe progressive respiratory failure, patients received invasive mechanical respiratory support (MRS) as indicated on the first day. All patients underwent hemodialysis, under the control of hemodynamics, CBS, respiratory system, supportive, antibacterial, anti-inflammatory, syndromic corrective intensive therapy in accordance with existing recommendations in the literature. A favorable outcome with restoration of full functional activity of the kidneys and discharge from the hospital was observed in 13 children (groups 1 and 2), an unfavorable outcome – in 7 children (group 3). The first group consisted of patients who received intensive therapy in the ICU for up to 10 days (6 patients), the second - children with a favorable outcome after intensive therapy for 12 - 45 days (7 patients), the third - 7 patients with an unfavorable outcome. The assessment of changes in the components of the circadian rhythm was carried out by obtaining mesor indicators - the average daily level of the studied indicator, the amplitude of circadian fluctuations, the range of daily fluctuations, the duration of the inversion of the circadian rhythm of the studied hemodynamic parameters.

The research data were processed by the method of variation statistics using the Excel program by calculating arithmetic means (M) and errors of means (m). To assess the significance of differences between two values, the parametric Student's test (t) was used. The relationship between the dynamics of the studied indicators was determined by the method of paired correlations. The critical significance level was taken equal to 0.05.

Results and its discussion.

In all groups of children in the stage of oligoanuria acute renal failure, oxygen saturation indicators were within acceptable values, regardless of the severity of the condition, which indicated the positive effect of constant insufflation of an oxygen-air mixture at a concentration of 40-70%, when the value of the indicator in the acrophase, the amplitude and daily range of the circadian The rhythm of the oxygen saturation indicator showed a slight tendency to increase in more severe patients (Table 1).

Table 1.

Average values of the phase structure of the circadian rhythm of the oxygen saturation indicator in acute renal failure at the age of 7.1-18 years in %.

Groups	Mezor	In acrophase	In bathyphase	Amplitude	Daily range
1	97±1	98±0,4	95±1	1±0,2	3±1
2	96,3±0,6	97,7±0,6	94,3±1,2	1,5±0,4	3,4±1,1
3	97,5±1,0	99,2±0,6	94,5±2,6	1,7±0,7	4,7±2,4

As can be seen from the data presented in Tables 2 and 3, there were no significant changes in the mesor of the circadian rhythm of oxygen in the dynamics of the entire observation, as well as differences in the average circadian rhythm of oxygen saturation depending on the severity of the condition.

Table 2.

Dynamics of the mesor of the circadian rhythm of oxygen saturation

Days	1 group	2 group	3 group
1	96,4±0,8	95,7±1,4	95,6±1,5
2	95,9±0,8	96,6±0,9	97,2±1,4
3	96,1±0,5	95,5±1,0	97,8±0,4
4	96,7±0,8	97,2±0,6	96,5±1,9
5	96,3±0,7	96,0±0,5	96,3±0,6
6	96,5±0,9	96,5±0,7	94,3±1,8
7	97,5±0,4	97,0±0,8	96,1±1,3
8	96,7±0,8	97,8±0,3	97,5±0,5
9	98,2±0,3	97,3±0,4	97,9±0,4
10	95,8±0,8	97,2±0,4	98,0±0,6
11		97,1±0,4	96,5±1,7
12		95,3±0,6	97,1±1,2
13		96,7±0,5	98,7±0,4
14		95,9±0,4	96,1±0,7
15		94,6±0,5	97,7±0,7
16		95,9±0,7	97,9±0,9
17		94,8±1,1	98,1±1,1
18		95,6±0,5	96,5±1,3
19		96,2±0,9	97,5±1,5
20		95,5±0,7	97,8±0,9
21		96,6±0,5	98,6±0,5
22		95,6±0,7	99,4±0,6
23		96,5±0,6	99,0±0,1
24		96,0±1,1	98,1±0,3

25		96,6±0,7	96,2±2,8
26		96,3±0,7	98,5±1,0
27		96,8±0,6	97,8±1,1
28		96,6±1,1	98,8±0,4
29		96,4±1,2	98,7±0,4
30		96,4±0,8	99,1±0,2

Table 3.

Average circadian rhythm of oxygen saturation in 7.1-18 years with acute renal failure

Hours	**1 group**	**2 group**	**3 group**
8	96±1	96,1±1,0	97,8±1,4
9	96±1	96,0±0,9	97,9±1,2
10	97±1	96,1±1,0	97,8±1,4
11	97±1	96,1±1,0	97,6±1,4
12	97±1	96,0±1,0	97,4±1,3
13	97±1	96,2±0,9	97,4±1,5
14	98±0,4	95,7±1,1	97,5±1,4
15	97±1	96,4±0,8	97,4±1,6
16	97±1	96,4±0,9	97,3±1,6
17	97±1	96,5±0,8	97,5±1,3
18	97±1	96,5±1,0	97,3±1,3
19	97±1	96,3±0,9	97,4±1,2
20	97±1	96,5±0,8	97,1±1,6
21	97±1	96,1±1,2	97,5±0,9
22	97±1	96,2±1,2	97,4±1,1
23	96±1	96,5±0,9	97,6±1,1
24	97±1	96,2±0,9	98,0±1,1
1	96±1	96,3±1,0	97,5±1,3
2	96±1	96,2±1,0	97,8±1,2
3	96±1	96,5±0,9	97,5±1,5
4	96±1	96,5±0,8	97,3±1,5
5	96±1	96,3±0,7	97,5±1,4
6	96±1	96,5±0,6	97,4±1,4
7	96±1	96,3±1,0	97,6±1,3

Despite the predominantly constant supply of the oxygen-air mixture, the oscillatory nature of the studied indicator was revealed in dynamics in all groups (Fig. 1). The period of fluctuation of the indicator was 5,3,5 days in group 1, 3,2,6,3,2,3,2,2,3,3 days in group 2, 7.4, 3.4 in group 3, 7,2,2 days. The deforma-

tion of the periweekly rhythm in groups 1 and 2 consisted of a decrease in the wavelength of the phase cycle, while in group 3 there was an increase in the wavelength of the periweekly rhythm and an increase in the amplitude of oscillations almost three times compared to the amplitude of oscillations in group 2.

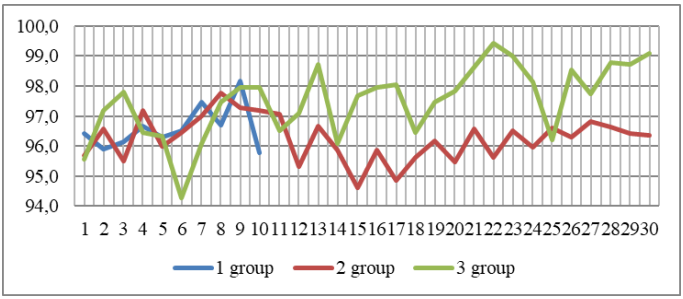

Figure 1. *Dynamics of the mesor of the circadian rhythm of oxygen saturation in 7.1-18 years, in %.*

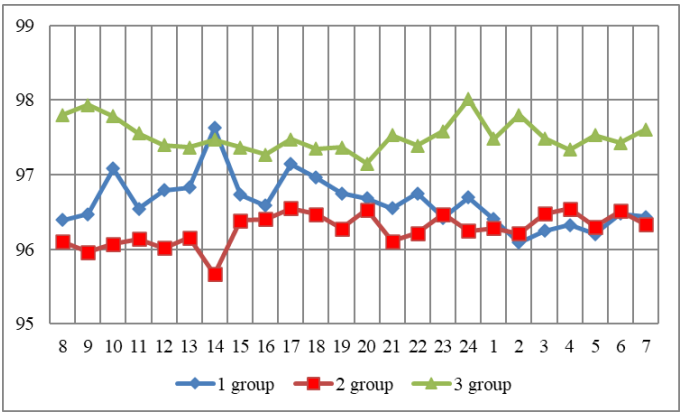

Figure 2. *The average circadian rhythm of oxygen saturation is 7.1-18 years, in%.*

We noticed a relatively higher level of the average circadian rhythm of the oxygen saturation indicator in group 3, slightly less in groups 1 and 2 of children, which was associated with the use of insufflation of a more concentrated oxygen-air mixture in heavier children on mechanical ventilation. The relatively slightly higher values of the indicator in group 1 (with spontaneous breathing) are due to a more favorable state of the respiratory system than in groups 2 and 3. The discovered features of the influence of the severity of the condition on the

oxygen saturation indicator confirm the need for more effective anti-inflammatory therapy, the development of methods to improve the oxygen permeability of the alveolocapillary membrane with concomitant bronchopneumonia in children of groups 2 and 3.

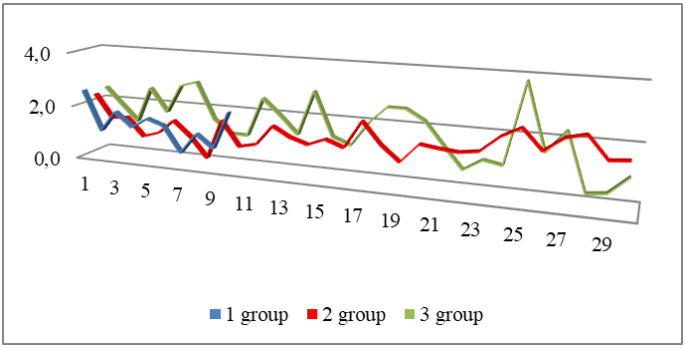

Figure 3. *Amplitude of the circadian rhythm of oxygen saturation, in%.*

The highest values of the amplitude of the circadian rhythm and daily fluctuations in oxygen saturation in group 3 were due, compared with groups 1 and 2, to more pronounced disturbances in the permeability of the alveolocapillary membrane due to the insufficient effectiveness of stopping a more pronounced systemic inflammatory reaction (Fig. 3, 4).

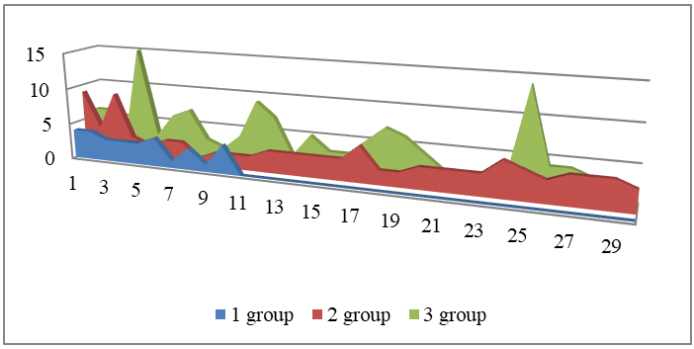

Figure 4. *Range of daily fluctuations in oxygen saturation, in%.*

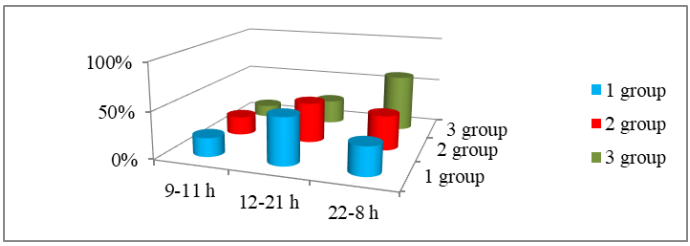

Figure 5. *Duration of circadian rhythm inversion of oxygen saturation*

As can be seen from the data presented in Fig. 5, the longest (18 days) inversion of the circadian rhythm of the oxygen saturation indicator was observed in group 3, the minimum (3 days) in group 1. The shift to higher oxygen saturation values at night may be due to the natural routine limitation of water load at night, the lack of hemodynamic load of hemodialysis on the pulmonary circulation, since all patients underwent hemodialysis mainly in the morning-day hours.

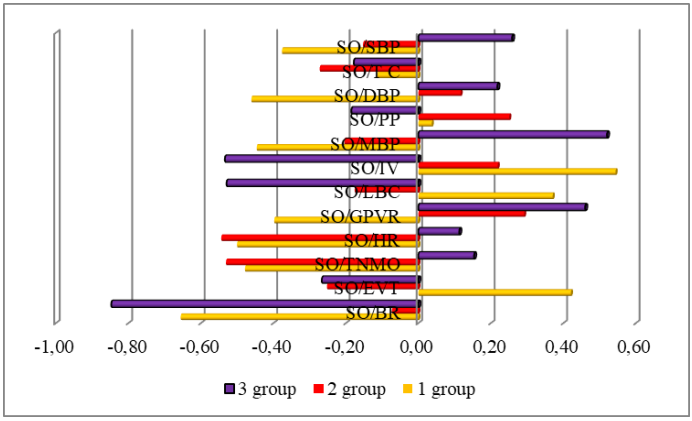

Figure 6. *Correlations of oxygen saturation*

A negative correlation between oxygen saturation and respiratory rate in group 3 (-0.85) during spontaneous breathing before transferring patients to mechanical ventilation revealed a connection, characteristic of respiratory failure, between a compensatory increase in respiratory rate and a decrease in the level of oxyhemoglobin in the blood. The same direction, but a tendency towards increased respiration with a decrease in oxygen saturation (-0.66) was noted in group 1 of children (Fig. 6). A tendency towards a compensatory increase in heart rate and an increase in MVP with a decrease in oxygen saturation was noted in group 1

(-0.5 and -0.48, respectively), as well as in group 2 (-0.54 and -0.53, respectively). But this compensatory reaction almost disappeared in group 3 (0.11 and 0.15, respectively). Thus, the severity of the underlying disease had a negative impact, leveling the compensatory functions of hemodynamics in the process of adaptation of the body to extreme conditions of existence. A tendency was revealed for a compensatory increase in MBV (-0.53) and SV (-0.53) to a decrease in oxygen saturation in group 3.

Conclusion. In all groups of children in the stage of oligoanuria acute renal failure, oxygen saturation readings were within acceptable values, regardless of the severity of the condition, which indicated the positive effect of constant insufflation of an oxygen-air mixture at a concentration of 40-70%, when the value of the indicator in the acrophase, the amplitude and daily range of the circadian rhythm of the oxygen saturation indicator showed a slight tendency to increase in more severe patients. Noteworthy was the relatively higher level of the average circadian rhythm of the oxygen saturation indicator in group 3, slightly less in groups 1 and 2 of children, which was associated with the use of insufflation of a more concentrated oxygen-air mixture in sicker children on mechanical ventilation. The relatively slightly higher values of the indicator in group 1 (with spontaneous breathing) are due to a more favorable state of the respiratory system than in groups 2 and 3. The discovered features of the influence of the severity of the condition on the oxygen saturation indicator confirm the need for more effective anti-inflammatory therapy, the development of methods to improve the oxygen permeability of the alveolocapillary membrane with concomitant bronchopneumonia in children of groups 2 and 3. The severity of the underlying disease had a negative impact, leveling the compensatory functions of hemodynamics in the process of adaptation of the body to extreme conditions of existence.

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7.1-18岁少尿期急性肾功能衰竭强化治疗

INTENSIVE THERAPY OF ACUTE RENAL FAILURE IN THE PHASE OF OLIGOANURIA AT THE AGE OF 7.1-18 YEARS OLD

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抽象的。 根据对 20 名 7.1-18 岁急性肾衰竭儿童的研究，得出以下结论。 平均每日输液量不超过1500ml/天，这表明7.1-18岁急性肾衰竭急性期水负荷受到显着限制。 在最重的儿童组中，发现了最显着的限制（600 毫升/天）。 三组静脉给药无显着差异； 仅在第3组中，主要施用蛋白质培养基和洗涤的红细胞。 在补偿当前损失时，优先考虑口头方式。 第 2 组进行了最积极的压力限制治疗，包括缓解疼痛。第 3 组在 13 天后进行了最积极的抗炎治疗，这主要是由于糖皮质激素用量的增加。 抗菌治疗的量实际上与病情的严重程度无关。 第2组的儿童接受了最大量的血管扩张剂治疗，给药频率为每天4至8次，具体年龄特定的治疗剂量，在第7天和第22天增加到最大值。 最活跃的蛋白质输血疗法在第3组中进行。第1组和第2组中提供的肠外营养支持量不超过100卡路里，第3组中提供的肠外营养支持量不超过50卡路里。 在最严重的患者中，实际上不进行用利尿剂刺激利尿。

关键词：重症监护，急性肾功能衰竭，儿童。

Abstract. *Based on a study of 20 children with acute renal failure aged 7.1-18 years, the following was revealed. The average daily volume of administered fluid did not exceed 1500 ml/day, which indicates a significant limitation of water load in the acute phase of acute renal failure at 7.1-18 years of age. In the heaviest group of children, the most significant limitation was revealed (by 600 ml/day). There*

was no significant difference in intravenous administration in all three groups; only in group 3 the administration of protein media and washed erythrocytes predominated. When reimbursing current losses, preference was given to the oral method. The most active stress-limiting therapy, including pain relief, was carried out in group 2. Anti-inflammatory therapy turned out to be the most active after 13 days in group 3, mainly due to an increase in the administration of glucocorticoids. The volume of antibacterial therapy was practically independent of the severity of the condition. The largest volume of vasodilator therapy was carried out in children of group 2 with a frequency of administration from 4 to 8 times a day in age-specific therapeutic doses, increasing to a maximum on the 7th and 22nd days. The most active protein-hemotransfusion therapy was carried out in group 3. Parenteral nutritional support was provided in a volume of no more than 100 calories in groups 1 and 2 and in group 3 no more than 50 calories. In the most severe patients, stimulation of diuresis with saluretics was practically not carried out.

Keywords: *Intensive care, acute renal failure, children.*

Relevance. Mortality in acute renal failure (ARF) in children ranges from 10 to 40%. In the classical form of hemolyticouremic syndrome (HUS), the prognosis is favorable, in the atypical form it is unfavorable. The transition to chronic renal failure after acute renal failure in 10-20% is observed in the first 3-5 years after renal acute renal failure. Clinical trials have not proven the effectiveness of loop diuretics, dopamine, mannitol, which are often used for the treatment and prevention of acute renal failure. There is no convincing evidence that drug therapy for acute renal failure effectively reduces the need for hemodialysis or reduces the duration of dialysis treatment; risk of death. Recommendations for the treatment of acute renal failure consist of syndromic correction of homeostasis, dialysis-filtration treatment methods, prevention and treatment of complications of acute renal failure [1-6]. Due to the lack of information on intensive care during the phase of oligoanuria against the background of hemodialysis in childhood, we assessed the volume and components of complex intensive care in school-age children.

Goal of the work. To study and give a comparative assessment of intensive therapy for acute renal failure in the phase of oligoanuria at school age.

Material and research methods. Indications for hemodialysis (renal replacement therapy (RRT)) were: anuria with a progressively worsening condition of the patient; an increase in urea level more than 20 mmol/l. Data from hourly monitoring of hemodynamic parameters and body temperature were studied in 20 children with acute renal failure admitted to the ICU with anuria from 1 to 3 days at the age of 7.1 to 18 years. Before admission to the clinic, all patients received anti-inflammatory therapy aimed at treating pneumonia, ARI, AEI HUS.

Due to severe progressive respiratory failure, patients were provided with invasive mechanical respiratory support on the first day according to indications All patients underwent hemodialysis, under the control of hemodynamics, acid-base balance, respiratory system, supportive, antibacterial, anti-inflammatory, syndromic corrective intensive therapy in accordance with existing recommendations in the literature. A favorable outcome with restoration of full functional activity of the kidneys and discharge from the hospital was observed in 13 children (1 and 2 groups), unfavorable outcome – in 7 children (group 3). The first group consisted of patients (6) who received intensive therapy in an ICU for up to 10 days, the second group included children (7) with a favorable outcome (11-30 days). Data from daily intensive care monitoring are presented. The study of drug correction was carried out taking into account the frequency of administration in a therapeutic age dosage of anti-inflammatory (dexamethasone, prednisolone, non-steroidal anti-inflammatory drugs), antibiotic therapy (broad-spectrum antibiotics with correction based on the results of bacteriological control), stress-limiting (sedatives, sibazone, Arduan, ketamine, profol, barbiturates) , vasodilators (farmadipine, noshpa, enalapril, aminophylline), diuretics (furosemide), membranotropic (l-lysine escinate, B vitamins, citicoline) correction. According to indications in the process of intensive therapy during hemodialysis, the indications included the introduction of glucose (calories) as an energy substrate, compensation of the deficit of bcc (erythrocyte mass, albumin), and, according to indications, FFP. The research data were processed by the method of variation statistics using the Excel program by calculating arithmetic means (M) and errors of means (m). To assess the significance of differences between two values, the parametric Student's test (t) was used. The relationship between the dynamics of the studied indicators was determined by the method of paired correlations. The critical significance level was taken equal to 0.05.

Results and its discussion. As can be seen from the data presented in Table 1, the average daily volume of administered fluid did not exceed 1500 ml/day, which indicates a significant limitation of water load in the acute phase of acute renal failure at 7.1-18 years. In the heaviest group of children, the most significant restriction was revealed (by 600 ml/day) relative to the administration in groups 1 and 2 of children (Table 1). Noteworthy is the absence of significant differences in intravenous administration in all three groups, when in group 1 14% of the volume was glucose for the purpose of energy replacement and 16% was protein-hemotransfusion media, in group 2 24% was glucose, 17% according to indications was plasma, blood transfusion of red blood cells, in group 3 -9% glucose, 35% protein transfusion drugs. It was noteworthy that in group 3 the volume of blood transfusions prevailed over the correction of hypo/dysproteinemia. Probably, this method of correcting anemia carried out in group 3, accordingly, had an even more pro-

nounced negative effect on the damaged renal parenchyma, which was in a state of severe ischemia, in patients of group 3. Apparently, it makes sense to look for other ways to compensate for the deficiency of erythrocytes, perhaps by stimulating hematopoiesis, or increasing the transport and delivery of oxygen to ischemic cells, including the renal parenchyma, the glomerular apparatus of the kidneys. One of the leading complications associated with the ineffectiveness of treatment, the progressive severity of the condition, multiple organ failure in group 3 despite hemodialysis, complex intensive therapy, was the most pronounced disturbance of urinary activity, oligoanuria throughout the entire observation period (more than 30 days in 2 children), amounting to on average 97±51 ml/day. In 5 patients, an unfavorable outcome was observed in the first 3 weeks of treatment.

Table 1.

Average water balance indicators for acute renal failure at 7.1-18 years

Groups	Total volume, ml/day	Intravenously, ml/day	Orally, ml/day	Calories per day.	Proteins, ml/day	Diuresis, ml/day
1	1420,7±299,8	265,8±101,5	1154,3±380,4	37,0±33,4	45,0±18,3	559,9±205,8
2	1410,2±202,0	283,7±89,0	1148,3±177,2	69,7±32,9	48,4±26,1	447,3±124,9
3	893,4±241,5*‴	302,7±167,7	598,0±133,7*‴	29,2±21,0	106,6±82,8	97,3±51,9*‴

*- significant relative to the indicator in group 1

‴-reliable relative to group 2

Table 2.

Drug therapy according to the severity of the condition in acute renal failure at 7.1-18 years of age, frequency of administration per day

Groups	Anesthesia	Anti-inflammatory	AB	Heparin	Hemostatics	Metabolite (vitamins B, nootropics)	Vasodilators	Diuretics
1	1,2±0,3	0,9±0,5	2,3±0,3	2,8±0,4	0,1±0,2	0,5±0,2	5,8±1,5	2,7±1,4
2	3,4±0,7‴	2,2±0,8	2,3±0,6	3,6±0,5	0,1±0,02	0,2±0,1	6,2±1,2	1,4±0,6
3	2,4±1,0	2,8±0,4‴	2,2±0,9	0,6±0,2‴	1,4±0,5‴	0,9±0,3	1,9±0,7‴	0,1±0,02‴

‴- significant relative to the indicator in group 1

On average, during the observation period, the most active antianginal, sedative, and hypnotic drugs were administered almost three times more than in group 1, that is, in general, stress-limiting therapy was carried out in group 2. While in patients of group 3, the frequency of administration of sedatives and painkillers was twice as high as treatment in group 1 (Table 2). The study of the activity of anti-inflammatory therapy revealed the greatest administration, mainly due to hormones in group 3, when the frequency of administration was three times greater than in group 1 and 140% more than in group 2. There were no significant differences in antibiotic therapy based on the severity of the condition. Noteworthy was a significantly significant decrease in the administration of anticoagulants,

vasodilators, saluretics and a significantly larger volume of hemostatic therapy in children of group 3 (Table 2).

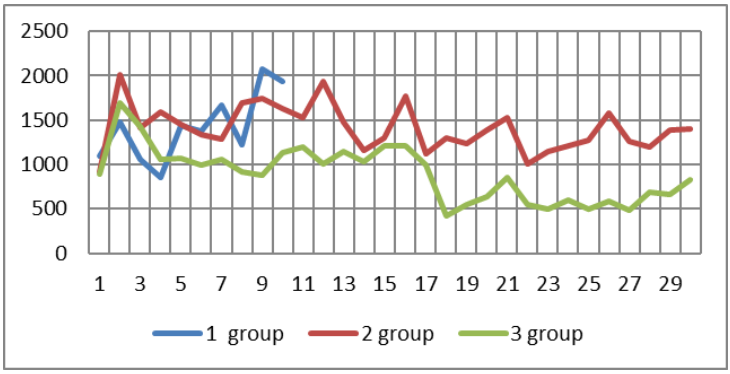

Figure 1. *Daily fluid volume, ml/day*

The daily volume of administered fluid in groups 1 and 2 fluctuated on average about 1500 ml/day, in group 3 about 1000 ml/day. The latter was due to the severity of the condition caused by progressive heart failure, persistent oligoanuria, and such severe complications as DIC and MODS (Fig. 1).

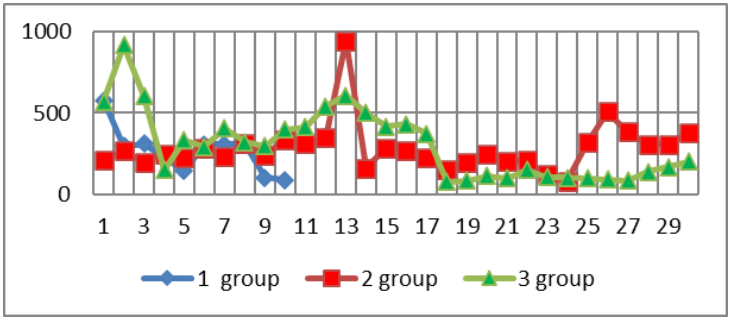

Figure 2. *Administered parenterally, ml per day.*

The largest volume of parenteral infusion therapy on day 1 was found in patients of groups 1 and 3 (Fig. 2). The need to increase intravenous administration in groups 2 and 3 was identified on the 13th day to 900 ml/day and 600 ml/day, respectively, which was associated with an exacerbation of the systemic inflammatory response and intoxication.

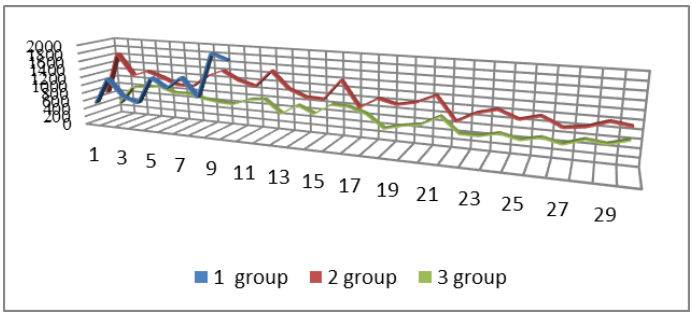

Figure 3. *Administered enterally, ml per day*

It should be noted that preference was given to the oral method when replacing current fluid losses. Thus, the largest volume of enteral replacement up to 1800 ml/day was in group 1 on the 7th day. Enteral nutrition in group 2 fluctuated, averaging 1148.3±177.2 ml/day, the lowest in group 3, amounting to 598.0±133.7 ml/day (Fig. 3, Table 1).

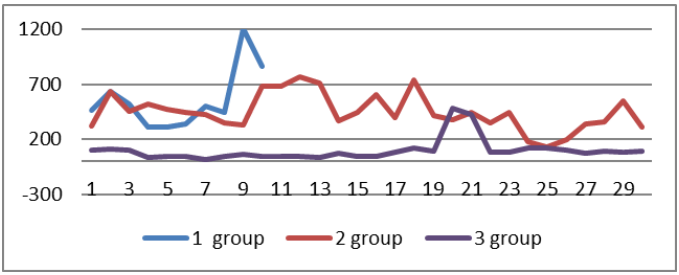

Figure 4. *Dynamics of urinary function of the kidneys, ml/day*

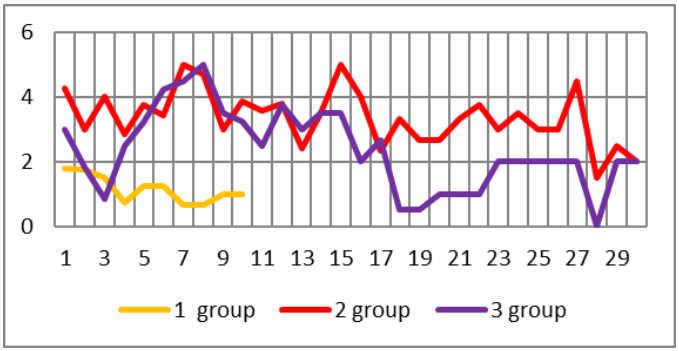

Figure 5. *Anesthesia, sedative therapy, frequency of administration per day*

The most active stress-limiting therapy, including pain relief, was carried out in group 2, decreasing in dynamics to a level almost half as much after 18 days in children of group 3 (Fig. 4). The latter was due to progressive acute cerebral insufficiency, coma, with mandatory mechanical respiratory support (Fig. 5).

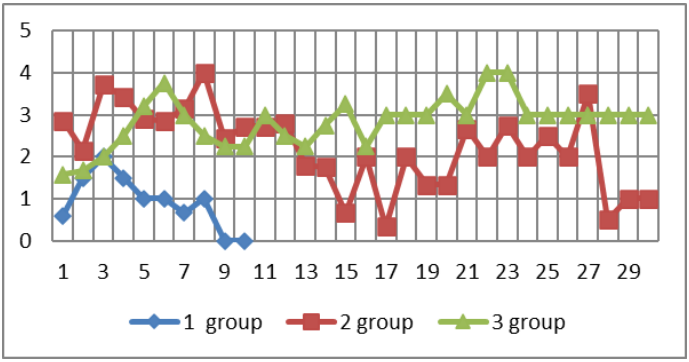

Figure 6. *Anti-inflammatory therapy, frequency of administration per day*

Anti-inflammatory therapy after 13 days turned out to be most active in group 3, mainly due to an increase in the administration of glucocorticoids (Fig. 6).

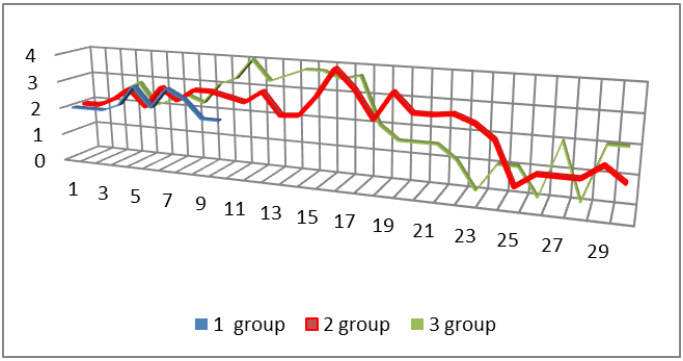

Figure 7. *Antibiotic therapy, frequency per day*

The volume of antibacterial therapy was practically independent of the severity of the condition. Although it is logical to assume that the more severe the patient's general condition, the more active timely therapy is indicated (Fig. 6). The frequency of administration of the anticoagulant was most active in group 2. Significantly less heparin was administered in group 3, supplementing complex therapy with the introduction of hemostatic agents, FFP on the 1st day of treatment

and after the 13th day, due to laboratory confirmation of an increased risk of hemorrhagic complications (Fig. 8).

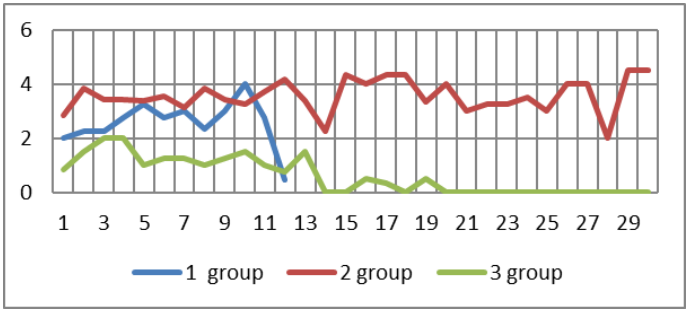

Figure 8. *Heparin, multiplicity per day.*

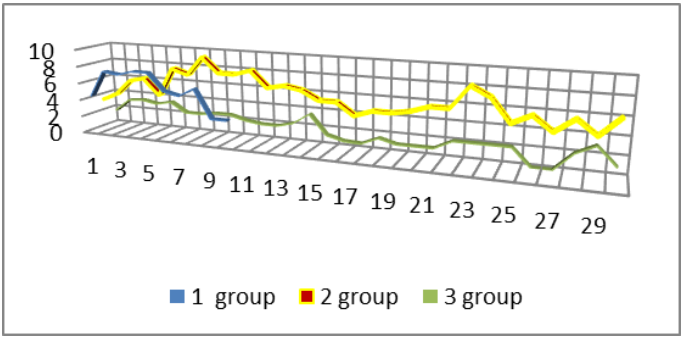

Figure 9. *Vasodilators, frequency per day.*

The largest volume of vasodilator therapy was manifested in children of group 2 with a frequency of administration from 4 to 8 times a day in age-specific therapeutic doses, increasing to a maximum on the 7th and 22nd days, which coincides with the volume of stress-limiting therapy and is most likely due to the insufficiency of anti-inflammatory and/or antibiotic therapy by the end of the first week, when instead of the expected physiological decline in the inflammatory reaction in the conditions of effective complex therapy, clinical and functional signs of exacerbation of intoxication were noted (Fig. 9). This assumption was confirmed by a decrease in the urinary activity of patients in group 2 (Fig. 4). It should be noted that there was a tendency to reduce the total volume of infusion therapy on day 7 in group 2, which could negatively affect the perfusion characteristics of the renal blood flow. Perhaps an adequate increase in vasodilator correction on day 7 contributed to the achievement of a positive effect of anti-ischemic therapy, an in-

crease in capillary blood flow above a critical level caused by a local inflammatory reaction in the renal parenchyma, which contributed to a more effective restoration of renal excretory function in group 2 patients.

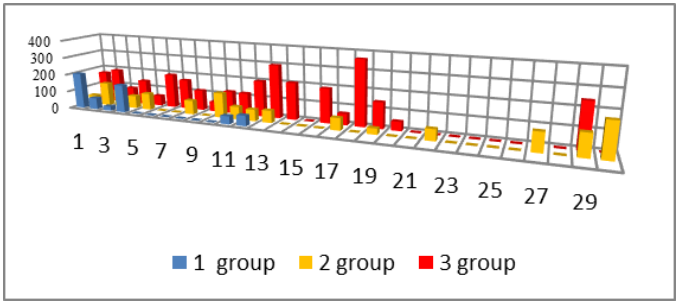

Figure 10. *Protein-hemotransfusion therapy, ml/day*

The most active protein hemotransfusion therapy was carried out in group 3, which was associated with a tendency to hemorrhagic complications caused by more severe intoxication, MODS, anemia in the absence of signs of active bleeding (Fig. 10).

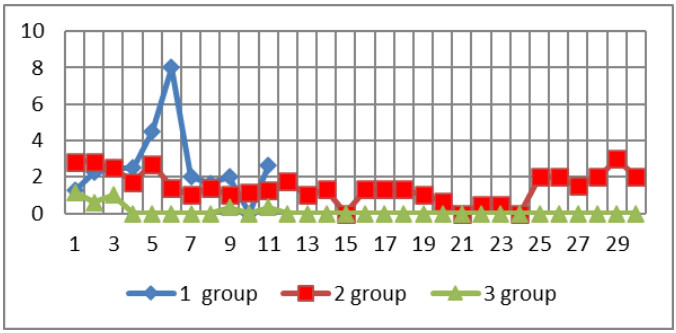

Figure 11. *Furosemide, frequency of administration per day*

In the most severe patients, stimulation of diuresis with saluretics was practically not carried out (Fig. 11). Parenteral nutritional support was provided in a volume of no more than 100 calories in groups 1 and 2 and in group 3 no more than 50 calories (Fig. 12). Considering the severity of hypermetabolism and the concomitant dysfunction of the digestive system caused by the underlying disease, we can assume a significant insufficiency of parenteral nutritional correction of severe energy deficiency in acute renal failure in children.

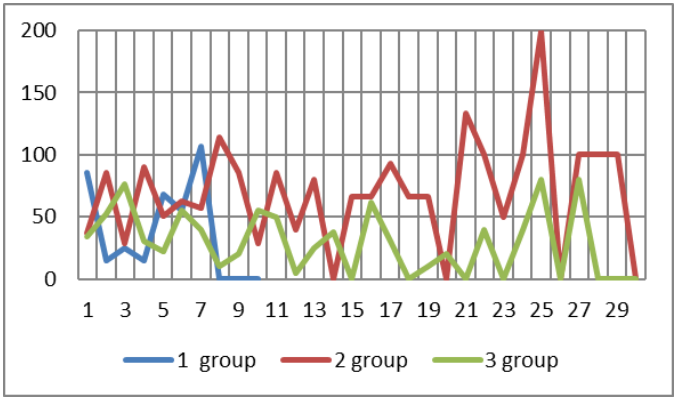

Figure 12. *Parenteral nutritional support, calories*

Conclusion. The average daily volume of administered fluid did not exceed 1500 ml/day, which indicates a significant limitation of water load in the acute phase of acute renal failure at 7.1-18 years of age. In the most severe group of children, the most significant limitation was revealed (by 600 ml/day. There was no significant difference in intravenous administration in all three groups; only in group 3, the introduction of protein media and blood transfusions predominated. Preference for replacing current fluid losses was given to the oral method. The most active stress-limiting therapy, including pain relief, was carried out in group 2, decreasing in dynamics to a level almost half as much after 18 days in children of group 3. Anti-inflammatory therapy after 13 days turned out to be the most active in group 3, mainly with glucocorticoids. The volume of antibiotic therapy practically did not depend on the severity of the condition. The largest volume of vasodilator correction was carried out in children of group 2 with a frequency of administration from 4 to 8 times a day in age-specific therapeutic doses, increasing to a maximum on days 7 and 22. The most active protein and blood transfusion therapy was carried out in group 3. Parenteral nutritional support was carried out in a volume of no more 100 calories in groups 1 and 2 and in group 3 no more than 50 calories. In the most severe patients, stimulation of diuresis with saluretics was practically not carried out.

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学生认为的Papillomavirus感染
PAPILLOMAVIRUS INFECTION ACCORDING TO STUDENTS' VIEW

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抽象的。 该文章提供了医科大学和其他专业大学的学生对乳头瘤病毒感染、感染途径以及人乳头瘤病毒（HPV）疫苗接种的认识水平的数据。 学生尤其是非医科大学学生对HPV疫苗接种、诊断该感染的特点及其临床后果的认识不足。 医科大学学生的认知水平较高，这可能与教育过程中妇产科专题材料的学习有关。

关键词：学生青年、乳头瘤病毒感染、意识、疫苗接种。

Abstract. *The article presents data on the level of awareness of students studying at medical universities and universities of other profiles about papillomavirus infection, routes of infection, as well as vaccination against the human papillomavirus (HPV). Insufficient awareness of students, especially non-medical universities, about HPV vaccination, the features of diagnosing this infection and its clinical consequences was discovered. Students of a medical university showed a higher level of awareness, which can be associated with the study of thematic material on obstetrics and gynecology during the educational process.*

Keywords: *student youth, papillomavirus infection, awareness, vaccination.*

The human papillomavirus is an epitheliotropic DNA-containing virus with a proven ability to cause carcinogenesis, transmitted to a partner during any type of sexual contact. The target cell for HPV damage is the basal epithelial cell, during infection of which the replication of the viral genome occurs in the cell nucleus, and viral particles are formed only at the last stages of differentiation of epithelial

cells. Despite the relatively simple organization of the virus genome, HPV is one of the few viruses with proven oncogenic potential [1]. Currently, more than 200 types of HPV have been discovered and studied, which are classified as high and low oncogenic risk. The maximum oncogenic danger is demonstrated by papillomavirus genotypes 16,18,31,33,35, while they account for about 70% of cervical cancer cases worldwide [2-4].

HPV is transmitted from person to person mainly through sexual contact, with the probability of infection through sexual contact being at least 70%. It should be noted that, in addition to this, other methods of infection are possible: through the skin and infected surfaces, and there is also a vertical transmission mechanism - from mother to child. Research over the past decade has revealed the role of HPV in the development of squamous cell carcinoma of the neck and head, esophageal, bladder, head and neck cancer, as well as brain and lung tumors [5,6]. The level of HPV infection depends on a combination of medical and behavioral factors, including gender, age of sexual debut, socio-demographic characteristics and level of education, risky sexual behavior, religious beliefs, and use of contraceptive methods.

To prevent HPV infection, bivalent and quadrivalent vaccines are currently used in 125 countries around the world [7], with the target population for vaccination being adolescent girls before they become sexually active. The World Health Organization (WHO) has formulated the thesis that to significantly reduce the incidence of cervical, vaginal and vulvar cancer, about 90% of adolescent girls should be vaccinated against HPV before sexual activity by 2030 [4,7]. Unfortunately, despite the availability of the vaccine in many countries and the efforts of health care professionals at various levels, the proportion of vaccinated people in 2019-2021 remains low.

The increase in cancers associated with HPV, including cervical and penile cancer, as well as oral malignancies, increases the need to inform various segments of the population around the world about this pathogen. According to health promotion theory, awareness and knowledge about HPV and the HPV vaccine promotes adoption and maintenance of HPV prevention efforts, including vaccination and screening for HPV-associated reproductive diseases..

The undisputed target group when discussing issues of awareness of various categories of patients about human papillomavirus infection (PVI) is young people. On the one hand, boys and girls represent a particularly significant category of the population that influences demographic processes in the state in the present and future. On the other hand, it is young people as a social group that are characterized by risky reproductive behavior, manifested not only in an insufficient level of interest in their own sexual health, but also in low awareness of the human papillomavirus, its transmission mechanisms and clinical manifestations. In

this context, general factors of high risk of HPV infection include: early onset of sexual activity, refusal of barrier contraception, sexually transmitted diseases (gonorrhea, syphilis, trichomoniasis), immunodeficiency conditions, the influence of internal factors (beriberi, deficiency conditions, latent stress), disruption of the normal microflora of the vagina, frequent inflammatory processes of the genital tract [8]. The most effective social tool for the prevention of HPV infection is currently considered to be increased awareness, especially among certain categories of the population at high risk of infection.

It is known that it is practicing doctors of various specialties, including obstetricians-gynecologists and dermatovenerologists, who play a key role in identifying the early stages of HPV-associated diseases of the human reproductive system. That is why determining the initial characteristics of the awareness of students of medical and non-medical universities about PVI can be useful in identifying potential mechanisms and ways of forming the population's opinion about the medical and social risks of this infection.

Purpose of the study: to assess the level of awareness of students studying at medical universities and other universities about human papillomavirus infection, routes of infection, and vaccination against HPV.

Materials and methods: an observational non-interventional prospective study was conducted in May 2023 at the Ural State Medical University, Yekaterinburg. Using a random sampling method, a general group was formed and surveyed through an anonymous questionnaire, which included 333 students from different universities in Russia. The main study group consisted of 219 students studying at medical universities in Russia (Ural State Medical University, Russian National Research Medical University named after N.I. Pirogov, St. Petersburg State Pediatric Medical University, Federal State Budgetary Educational Institution of Higher Education "Omsk State Medical University", First St. Petersburg State Medical University named after Academician I. P. Pavlov, Federal State Autonomous Educational Institution of Higher Education "First Moscow State Medical University named after I. M. Sechenov"). The control group included 114 non-medical university students. The average age of respondents in the first group was 21±3.7 years, and in the second group 19±0.9 years. The study was conducted using a specially designed anonymous questionnaire, including 24 questions containing information about methods of transmission of infection, vaccination and methods of preventing HPV.

Research results:

Almost all medical university students (95.0% of respondents) were aware of the existence of HPV, of which 85.4% knew about its sexual transmission. 9.6% of students believed that the human papillomavirus can be infected through personal contact. The trans-placental route of HPV transmission was noted by 3.2%

of respondents in the main group, the blood-contact route - 0.9% of respondents, the nutritional and airborne routes - by 0.5% of respondents, respectively. Some medical students (5.0%) did not know about the existence of the infection. Of the second group of respondents, 68.4% were aware of the human papillomavirus, but 31.6% of students did not have sufficient knowledge about HPV. 71.1% of respondents knew about the sexual transmission of this virus, 28.9% believed that HPV is transmitted through personal hygiene items (toothbrush, comb, towel), through household items, through biological fluids (feces, saliva, urine), from mother to child.

Reliable awareness of the methods of transmission of HPV is an extremely significant indicator and often determines the characteristics of sexual behavior in this aspect. 96.3% of students in the first group were convinced that infection can be caused by vaginal sex, 75.3% by anal sex, and 74.0% by oral sex. Among respondents in the second group, 88.6% believed that HPV infection occurs through vaginal sex, and only 46.5% indicated the risks of anal intercourse and 49.1% during oral sexual intercourse.

The awareness of students at various universities about the consequences of PVI infection was as follows. Respondents of the first group answered that in 54.3% HPV is associated with the occurrence of cervical dysplasia, in 57.1% - penile cancer, in 63.0% - genital warts and in 91.3% - cervical cancer. Students of non-medical universities noted the role of HPV in the formation of cervical dysplasia in 45.6% of cases, penile cancer in 53.5% of cases, genital warts in 38.6% of cases and cervical cancer in 68.4% of cases.

An indicator of the true attitude of young people to the problem of HPV-associated diseases is the awareness of a boy or girl about his own HPV status. A total of 46.6% of surveyed medical students knew their HPV status, only every fifth (21.9% of respondents) had information about the HPV status of their sexual partner. Only 28.9% of students at multidisciplinary universities were aware of their HPV status.46.5% of students have never been interested in and do not know about the presence of HPV in their sexual partner, only 13.2% of students know the HPV status of their sexual partner, 40.4% do not have a sexual partner.

The opinion of young people about potential sources of PVI infection is presented in Figure 1. Almost every third medical student (37.9%) believed that women are more often infected, 56.2% equally often both sexes, 4.1% noted men and 1. 8% noted children regardless of gender. According to 60.5% of respondents in the second group, both men and women are infected with HPV equally often, while 27.2% of respondents mentioned only women, 10.5% mentioned men, and 1.8% was convinced that one can become infected with HPV from children regardless of gender.

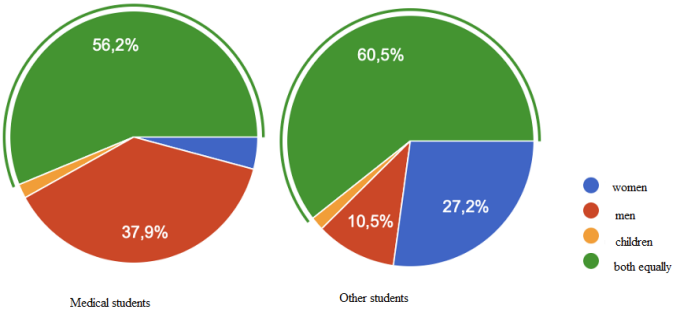

Figure 1. *"Students' opinion about the source of HPV infection"*

Students' awareness of the need for individual assessment of HPV status in males was as follows. The majority of respondents in the first group (96.3%) believed that men need to be examined for HPV, the remaining 3.7% found it difficult to answer or believed that men do not need to be examined. 87.7% of the second group of students were also convinced that men need to know their HPV status; every tenth respondent (12.3%) could not answer this question.

It is known that for timely detection of HPV and the diseases caused by it, it is necessary to visit an obstetrician-gynecologist and urologist-andrologist at least once a year. 25.1% of respondents in the first group visited specialists more than once a year, 55.3% no more than once a year. However, 11.0% of respondents contacted these specialists only once every 3 years, 8.7% of respondents - once every 5 years. Most of the students in the second group (53.5%) visited an obstetrician-gynecologist and urologist-andrologist once a year, 16.7% of students - no more than once every 3 years and 14.0% - once every 5 years. Every sixth respondent in group 2 (15.8%) consulted specialists 2 times a year. It deserves special attention that in 80.1% of cases, doctors never told students of both study groups about the human papillomavirus at routine appointments.

One of the basic characteristics of the reproductive choice made by students is their use of various methods of contraception. Only 53.4% of medical students preferred to use a condom as a method of barrier contraception. Of these, 60.7% used a barrier method of contraception for vaginal intercourse, 12.3% for anal intercourse and 4.1% for oral intercourse. Every sixth (15.5%) student of the first group used interrupted sexual intercourse as a method of contraception, 21.0% took combined oral contraceptives, and 37.0% reported no sexual intercourse. The situation was comparable in the group of students from non-medical universities. More than half of the respondents in the second group (57.0%) used condoms as a means of protection, while 64.9% used a barrier method of contraception during vaginal sex, 21.9% during anal intercourse and 9.6% during oral contact. Coitus

interruptus was practiced by 14.9% of respondents in the second group, 14.0% took combined oral contraceptives. Abstinence as a method of contraception was used by 36.8% of students in the second group. It should be noted that 6.1% of respondents in the second group did not take any precautions - they did not use any type of contraception.

Awareness about the availability of vaccination against PVI in Russia can be considered as a basis for implementing a cancer prevention strategy for cervical cancer in target population groups. Students of medical universities in 64.8% of cases believed that the vaccine against HPV is not included in the Russian national vaccination calendar, 13.7% were convinced that the vaccine against HPV can be given in a public clinic, 21.5% believed that vaccination against HPV is included in the national vaccination calendar, but at the expense of citizens. 75.3% of respondents noted that they would like to be vaccinated against HPV. Half of the respondents in the second group (50.9%) did not know either about the availability of the HPV vaccine in Russia or about the opportunity to vaccinate themselves. At the same time, 48.2% of students in the second group would like to be vaccinated against HPV.

Conclusions:

1. Students from medical universities demonstrated a higher level of awareness about the human papillomavirus and HPV vaccination compared to students from other universities.
2. Students from non-medical universities had an average level of knowledge about the routes of transmission of human papillomavirus infection, but in a third of cases (31.6%) they had never heard or knew anything about the human papillomavirus.
3. The discovered insufficient level of informing students about the problem of human papillomavirus infection is probably due to the lack of discussion of these issues during routine visits to doctors (gynecologists, andrologists). 80.1% of students in both groups noted that specialists never talked about the human papillomavirus at routine appointments.
4. The majority of students in both groups had an insufficient level of cancer alertness, not even knowing about the existence of some HPV-associated diseases, including cancer. Some medical students had inaccurate information about the consequences of PVI, for example, they believed that HPV can cause uterine fibroids (28.3%) and cervicitis (21.5%).
5. The vast majority of students surveyed believed that barrier contraception is necessary only for vaginal sexual intercourse and did not use condoms for other types of intimacy.

The study showed that there is a need to create a concept of targeted and systemic measures with the involvement of various specialists, including doctors, to

inform young people, especially girls, about the oncogenic potential of human papillomavirus infection, methods of its transmission, as well as methods of protection. Without a doubt, basic knowledge about the features of the course, diagnosis and clinical consequences of human papillomavirus infection is needed to encourage young women to participate in preventive diagnostic measures aimed at the primary prevention of HPV-associated pathology of the female and male reproductive system.

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内皮功能障碍的基因多态性标记与其在糖尿病足综合征发生过程中编码的物质水平的关系

RELATIONSHIP OF GENE POLYMORPHISMS MARKERS OF ENDOTHELIAL DYSFUNCTION WITH THE LEVEL OF THE SUBSTANCES THEY ENCODED DURING THE DEVELOPMENT OF DIABETIC FOOT SYNDROME

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Chita, Russia

注解。 目标：探讨糖尿病足发生过程中C786T基因eNOS和Lys198Ash END1多态性与其编码物质水平之间的关系。

材料和方法：对 198 名无并发症糖尿病患者和 199 名糖尿病足患者的内皮功能障碍标记基因多态性进行了研究。 在每组30名受试者中，对所研究基因的多态性发生频率具有可比性，对调节血管张力的因素进行了研究，并评估了它们与基因多态性的关系eNOS和Lys198Ash。

结果。 研究表明，C786T 基因多态性 eNOS 的基因型变异与糖尿病足血液中亚硝酸盐氮和总亚硝酸盐水平之间存在中等关系。

结论。 多态性C786T基因eNOS在糖尿病足发生发病机制中的作用被证实与亚硝酸盐和总亚硝酸盐含量存在适度关系，可能是该并发症发生发生的发病机制的组成部分之一 糖尿病。

关键词：糖尿病足，基因多态性，一氧化氮合酶，内皮素-1。

Annotation. Goal: *to explore the relationship between polymorphisms C786Tgene eNOS and Lys198Ash END1 with the level of substances they encode during the development of diabetic foot.*

Materials and methods: *Polymorphisms of endothelial dysfunction marker genes were studied in 198 patients with uncomplicated diabetes mellitus and 199 patients with diabetic foot. In 30 subjects of each group, comparable in frequency of occurrence of polymorphisms of the studied genes, factors regulating vascular tone were studied and their relationship with gene polymorphisms was assessed eNOS and Lys198Ash.*

Results. *A moderate relationship was revealed between genotype variants of the C786T gene polymorphism eNOS with level nitrite nitrogen and total nitrite in the blood in diabetic foot.*

Conclusion. *The role of polymorphism C786T gene eNOS in the pathogenesis of the development of diabetic foot is confirmed by the presence of a moderate relationship with the content of nitrite and total nitrite, which may be one of the components of the pathogenesis of the development of this complication of diabetes mellitus.*

Keywords: *diabetic foot, gene polymorphism, nitric oxide synthase, endothelin-1.*

Introduction. Morbidity Diabetes mellitus has been steadily increasing throughout the world in recent decades [4]. One of the serious complications of this pathology is the development of diabetic foot syndrome. In 30-80% of patients with this disease, rapid formation and long-term healing of soft tissue defects occur, often of a septic nature and causing high amputations in 30-50% of cases, leading to disability and mortality of patients [3, 5, 10].

One of the significant factors in the pathogenesis of diabetic foot syndrome is endothelial dysfunction [2]. In the synthesis of nitric oxide, one of the main substances determining endothelial dysfunction, involves the enzyme endothelial NO synthase (eNOS) [1]. If there are defects in the gene encoding this substance, the function of this enzyme may be reduced or suppressed, which will lead to a lack of nitric oxide [6, 8].

Endothelin-1 is one of the most powerful vasoconstrictors [2, 9]. Presence of gene changes END1, encoding the production of endothelin-1, leads to increased synthesis of this substance and the development of endothelial dysfunction [7].

In connection with the above, it is of interest to study the relationships between polymorphisms C786T gen eNOS, Lys198Ash of the END1 gene with the level of nitrites and endothelin-1 in the blood during the development of diabetic foot syndrome.

Goal of the work: explore the relationship between polymorphismsC786T-gene eNOS and Lys198Ash END1 with the level of substances they encode during the development of diabetic foot.

Materials and methods. The work was carried out on the basis of the State Clinical Hospital No. 1 of Chita in the period from 2016 to 2018. Group 1 included 198 patients with uncomplicated diabetes mellitus; group 2 included 199 patients with a mixed form of diabetic foot syndrome.

The study included 3 stages: Stage 1 – study of polymorphism C786T genes eNOS, Lys198Ash of the END1 gene in groups of patients, stage 2 - study of markers of endothelial dysfunction in 30 patients from each group, comparable in frequency distribution of these polymorphisms genes eNOS, END1 with data obtained at stage 1, stage 3 – assessment of the relationship between polymorphisms of the studied genes and the level of markers of endothelial dysfunction.

The study of genetic polymorphisms was carried out using the polymerase chain reaction method using a set of reagents according to the manufacturer's instructions on the basis of the Research Institute of Molecular Medicine of the Chita State Medical Academy.

The study of endothelial dysfunction markers was conducted using the solid-phase enzyme immunoassay method at the Laboratory of Experimental and Clinical Biochemistry and Immunology of the Research Institute of Molecular Medicine at Chelyabinsk State Medical Academy.

The statistical significance of differences in study indicators was assessed using Pearson chi-square. The normality of distribution was assessed using the Shapiro-Wilk test. The obtained data are presented as median and interquartile range (Me (25%; 75%)). When comparing groups in pairs, the Mann-Whitney test was used. To determine the relationship between the studied polymorphisms of the eNOS and END1 genes and markers of endothelial dysfunction, a correlation analysis was performed to determine the nonparametric Spearman correlation coefficient (ρ) and its confidence interval (95% CI). The strength of the connection and its direction were determined using the Chaddock scale. Statistical processing was carried out using the IBM SPSS Statistics Version 25.0 software package.

Results. According to our study, in patients with diabetes mellitus without diabetic foot and patients with the development of this complication, no statistically significant differences were identified in the frequency of genotypes of polymorphismsC786Tgene eNOS3 and Lys198Ash of the END1 gene.

We studied markers of endothelial dysfunction in 30 patients with diabetic foot and 30 patients with diabetes mellitus without complications. According to our data, we did not identify any significant differences in the concentrations of nitrogen nitrite (NO2), nitrogen nitrate (NO3) and total nitrate (NO2-/NO3-), and endothelin-1 in diabetic foot syndrome and in uncomplicated diabetes mellitus.

To assess the degree of relationship between polymorphismsC786Tgene eNOS, Lys198Ash gene END1 and markers of endothelial dysfunction, interval variables were converted into dichotomous variables.

When analyzing the data obtained, it was established moderate degree of relationship between the values of changes in NO2 concentration andNO2-/NO3- and polymorphismC786Tgene eNOS in the studied patients. At the same time, no connection was found between the NO3 level and the indicated gene polymorphism eNOS study groups. In patients with different types of diabetes mellitus, no relationship was recorded between the content of endothelin-1 and polymorphismLys198AshgeneEND1.

Conclusion. Frequency of occurrence of polymorphismC786Tgene eNOSAndLys198Ash of the END1 gene did not differ between the groups of patients examined. In patients with different types of diabetes mellitus, we did not identify any obvious

differences in the level of laboratory markers of endothelial dysfunction. Various variants of the Lys198Ash genotype in the END1 gene do not affect the level of endothelin 1 production in patients with different types of diabetes mellitus.

Pathogenic involvement of e gene polymorphism eNOS C786T in the development of diabetic foot syndrome is confirmed by the correlation of NO2 andNO2-/NO3-with genotype variants of this gene, which suggests its involvement in the formation of this pathology.

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互诚协会主导者的影响 UKHTOMSKY 论秋明市患有合并症的二龄女性进行越野行走时的身体表现

INFLUENCE OF THE DOMINANT OF A.A. UKHTOMSKY ON PHYSICAL PERFORMANCE OF WOMEN OF THE SECOND MATURE AGE IN TYUMEN WITH COMORBID PATHOLOGY DOING NORDIC WALKING

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抽象的。 本文介绍了秋明州 37 名第二成熟期女性（MG - 主要群体）的身体机能 (PP) 评估结果，这些女性正在接受合并症门诊治疗，并从以下角度练习越野行走 (NW)： A.A.院士主导的生理学说 乌赫托姆斯基。 第二组（CG - 对照组）由 32 名女性组成，她们没有临床和仪器证实的心血管系统、内分泌系统和血液疾病。 为了评估与年龄相关的 RF 值，使用了标准步骤测试 PWC 170，其中将人类

个体发生的第九期分为相等的 5 年段。 根据女性的护照年龄，PP 和最大耗氧量 (MOC) 水平显着下降。

关键词：女性、第二成年期、共病病理、越野行走、身体表现、乌赫托姆斯基优势。

Abstract. *The article presents the results of assessing physical performance (PP) in 37 women (MG - the main group) of the period of the second mature age in Tyumen, undergoing outpatient treatment for comorbid pathology, practicing Nordic walking (NW) from the standpoint of the physiological doctrine of the dominant of Academician A .A. Ukhtomsky. The second (CG - control group) consisted of 32 women who did not have clinically and instrumentally confirmed diseases of the cardiovascular system, endocrine system and blood. To assess the age-related values of RF, the standard step test PWC 170 was used, for which the ninth period of human ontogenesis was divided into equal 5-year segments. A significant decrease in the level of PP and maximum oxygen consumption (MOC) was shown depending on the passport age of women.*

Keywords: *women, period of the second adulthood, comorbid pathology, Nordic walking, physical performance, Ukhtomsky dominant.*

Relevance. In recent years, NW has become increasingly popular in various countries around the world, which is due to its availability in terms of not only increasing physical activity, but also as an effective means of improving health and preserving health [4, 7, 12]. Walking is simultaneously recreational and training, adequately loading the spinal column and joints of the lower extremities along the axis, while the load on the body is 2.5 times less than when running [17, 18, 21, 24]. There are few medical contraindications for practicing NW, which makes it popular and attractive for various age groups of the population [2, 22]. The undoubted advantages of NW include the fact that it allows you to increase the oxygen transport function of the body, thereby improving the functionality of the cardiorespiratory system [15, 16, 25, 26, 27, 28].

The importance and demand for NW contributed to the emergence of NW training technologies [1] and the publication of textbooks and guidelines for its use [3, 5, 10, 11, 14, 19, 20, 23]. Prospects for the use of NW are outlined [9].

Comorbid pathology in a therapeutic clinic, especially with increasing age, has great prognostic significance for doctors, because the presence of new reliable information can help improve the management of patients with a large number of concomitant diseases. This is significantly important at the outpatient stage of rehabilitation, especially in women of the second adulthood, whose rehabilitation treatment uses various physical activities, including synchronous exercise. Competent medical monitoring of the functional state of the female body, firstly, with various clinical courses of comorbid pathologies, including coronary heart disease

(CHD), iron deficiency anemia (IDA) and diabetes mellitus (DM2), will allow individualization of physical activity. Secondly, to correct rehabilitation treatment by prescribing medications taking into account basic indicators of the cardiovascular system (CVS), including heart rate (HR, beats/min), systolic (SBP, mmHg) and diastolic (DBP), mmHg) blood pressure.

As for the assessment of PP in women of the second adulthood with comorbid pathology, living in the city of Tyumen in Western Siberia as rehabilitation during outpatient treatment, using regular dosed physical exercises during NW exercises, then from the standpoint of the physiological doctrine of the dominant of Academician A.A. Ukhtomsky we have not found such studies in the available literature. In recent years, in our country, NW classes have been used quite widely [6, 8, 13].

According to the age periodization of human ontogenesis, adopted in our country in 1965, in this study, firstly, we divided the period of the second mature age, which lasts 20 years, into four 5-year periods of life. We believe that such an age division will make it possible not only to significantly individualize the dosage of physical activity, but also to trace the age-related (passport) dynamics of the functional state of the cardiovascular system. Secondly, to assess the functional capabilities of central hemodynamics by passport control of the age level of RF in NW, taking into account the dominance of Academician A.A. Ukhtomsky. Thirdly, compare the data we obtained during the study on the age-related dynamics of PP in women of the studied age with the results of other researchers.

Object of study: women of the second mature age, permanent residents of Tyumen.

Subject of the study: the level of physical performance of women with comorbid pathology in connection with an increase in passport age from the perspective of the dominant A.A. Ukhtomsky.

Research hypothesis. It has been suggested, firstly, that the presence of comorbid pathology reduces the functional capabilities of the body of women due to an increase in the passport age. Secondly, reasonable use of the dominant A.A. Ukhtomsky in the form of a positive suggestion about the benefits of Nordic walking for comorbid pathology can increase the level of physical performance of women. Thirdly, the conditional division of the 9th period of ontogenesis into equal 5-year periods of life will allow the doctor at the outpatient stage of treatment to individualize age-related physical activity in women when conducting Nordic walking for health purposes.

Purpose: from the dominant position of Academician A.A. Ukhtomsky in women of the period of the second mature age in Tyumen with comorbid pathology, using the step test PWC 170, to evaluate the age-related values of the RF during regular exercises in sports.

Material and methods. The examination was carried out on 69 women of the second adulthood, divided into two groups of equal size. The group consisted of

37 women 48.6±1.7 years old undergoing outpatient treatment at the Tyumen Regional Clinical Hospital No. 2 for comorbid pathology, including coronary heart disease, iron deficiency anemia and diabetes mellitus-2. Women in this group were diagnosed with 43 (62.3%) other diseases: kidney – 2; cerebrovascular diseases – 2; deforming osteoarthritis of the knee – 2 and hip joint – 3; gastric ulcer – 3; peripheral arteries – 3; connective tissue – 3; chronic nonspecific diseases of the bronchi and lungs – 4; glaucoma – 4, hypertension – 6; dental caries and periodontal disease – 11.

The CG included 32 women 47.7±1.8 years old, who at the time of examination had no clinically or instrumentally confirmed diseases of the cardiovascular system, endocrine system and blood.

Considering that the duration of the second adulthood period is 20 years, we consider it not entirely correct to judge the level of PP in a woman, for example, 36 years old, and compare her with a woman aged, for example, 54 years. To study PP, we conditionally divided this period into 5-year life spans (Fig. 1): from 36 to 40 years (MG n = 11, CG n = 10), from 41 to 45 years (MG n = 10, CG n = 8), from 46 to 50 years (MG n = 9, CG n = 8) and from 51 to 55 years (MG n = 7, CG n = 6).

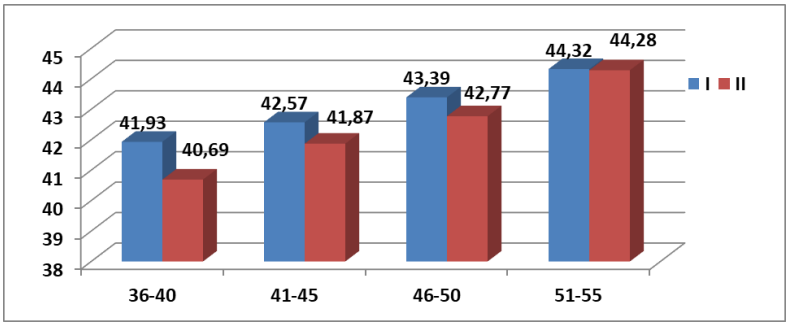

Figure 1. *Age composition of women in the compared groups.*

To assess PP, we used the WHO-recommended step test PWC 170. The maximum oxygen consumption (MOC) indicator was calculated using the formula: MOC = 2.2 × PWC170 + 1070 Body weight was measured on a lever scale with an accuracy of 50 g.

We consider control of heart rate and SBP and DBP values before, during and after NW to be a prerequisite for practicing NW.

NW classes were held within the framework of the federal innovation platform “Implementation of the principle of health savings in educational activities”, the national project “Demography” and the municipal program “Development of physical culture and sports in Tyumen “Sport Tyumen” for 2021-2026. Training

sessions and training for NW were carried out 3 times a week for one hour. Firstly, we consider instruction in the methods and techniques of agricultural production to be a prerequisite for each lesson. Secondly, about the benefits for the cardiovascular system of regular dosed physical activity in the form of health-improving exercises. Thirdly, carrying out verbal positive suggestion to create the physiological dominant of Academician A.A. Ukhtomsky, which not only increases women's interest in engaging in NW, but also motivates them to maintain a sufficient level of NW for a long time.

The research results were processed on a personal computer using modern electronic programs (Statistika). The study was conducted in accordance with the ethical standards set out in the Declaration of Helsinki and the European Community Directives (8/609EC) and the verbal informed consent of the women.

Results and discussion. To determine the level of PP in women with comorbid pathology, we consider it important to comply with the following provisions. Firstly, creating in them a good emotional and psychological mood about the importance of performing the standard step test PWC 170 for physical training and full-fledged physical rehabilitation, which consists of comprehensive information about the upcoming method of dosed physical activity. Secondly, a preliminary clinical and instrumental examination of women with comorbid pathology, allowing to assess the functional state of the CVS and identify possible contraindications to both the step test and the possibility of practicing CVS.

Using in clinical practice the physiological doctrine of the dominant, proposed by domestic academician A.A. Ukhtomsky (Fig. 2), we explained to each woman that the physical load that is given to them when climbing steps of various heights is not only short-term, but also very far from the possible maximum load, does not present any special difficulties and will in no way affect to your health.

Figure 2. *Alexey Alekseevich Ukhtomsky.*

The formula for calculating PP includes an indicator of body weight, the values of which increased with age. In women from the MG at the age of 36-40 years, the body weight was 64.26±2.30 kg, at 41-45 years old - 66.83±2.39 kg, at 46-50 years old - 67.74±2.33 kg , at 51-55 years old – 69.31±2.26 kg. In women of the CG - at the age of 36-40 years, the body weight was 63.86 ± 2.27 kg, at 41-45 years - 66.13 ± 2.39 kg, at 46-50 years - 67.69 ± 2.33 kg, at 51-55 years old – 70.07±2.26 kg. Thus, over the period from 36 to 55 years, the age-related increase in body weight of women in the MG was 5.05 kg, in the GC – 6.21 kg.

The results of studying the PP, firstly, showed that due to an increase in the passport age, it decreases. PWC 170 at the age of 36-40 years was equal to 593.84±16.3 kgm/min, at the age of 41-45 years – 526.92±15.4 kgm/min, at the age of 46-50 years – 462.36± 16.1 kgm/min, aged 51 to 55 years – 374.17±15.5. We especially note that we identified a reliably significant difference in the values of the PP with a positive verbal suggestion about the possibility of increasing the PP when creating a physiologically determined dominant of Academician A.A. Ukhtomsky. The test results showed that after suggestion, the PP significantly ($p<0.05$) increased and, accordingly, amounted to: 626.41±15.6 kgm/min; 561.23±16.1 kgm/min; 494.37±15.6 kgm/min; 408.21±16.4 kgm/min (Fig. 3).

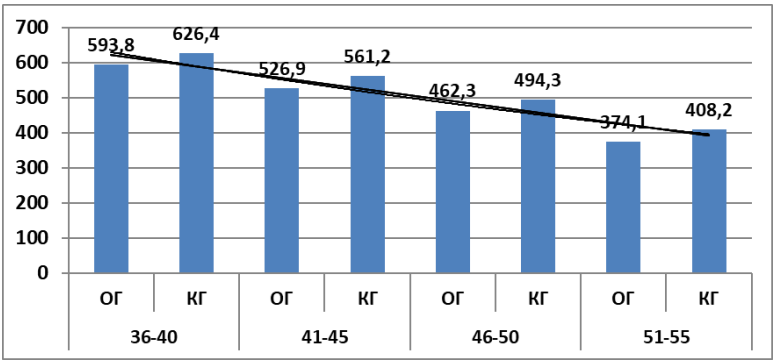

Figure 3. *Dynamics of age-related values of physical performance in women of the second mature age with comorbid pathology when practicing Nordic walking after verbal suggestion.*

Secondly, a significant dependence ($p<0.05$) of a decrease in the level of PP due to an increase in passport age was revealed (Fig. 4), amounting to 219.7 kgm/min in absolute values.

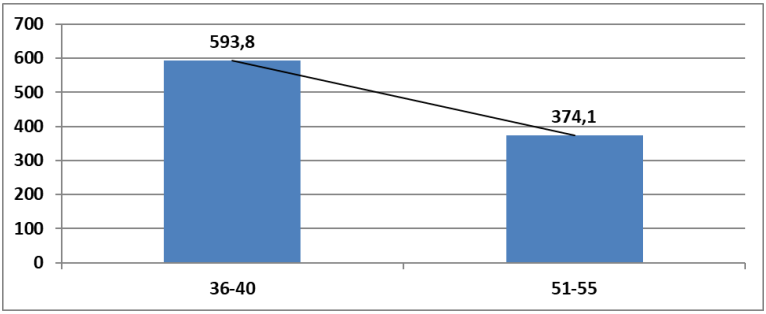

Figure 4. *Values of the level of physical performance in women of the second mature age with comorbid pathology, depending on the passport age.*

Thirdly, we drew attention to the fact that if the values of the PP in women under the age of 50 were at almost the same level ($p>0.05$), then after reaching the age of 50 the PP significantly ($p<0.05$) became less.

As for women in the CG, their PP indicators in absolute values were significantly ($p<0.05$) higher than those of their peers in the MG. PWC 170 kgm/min at the age of 36-40 years was equal to 629.57±17.1 kgm/min, at the age of 41-45 years – 569.18±16.7 kgm/min, at the age of 46-50 years – 497 .43±17.6 kgm/min, at the age of 51 to 55 years – 414.29±15.5 kgm/min (Fig. 5).

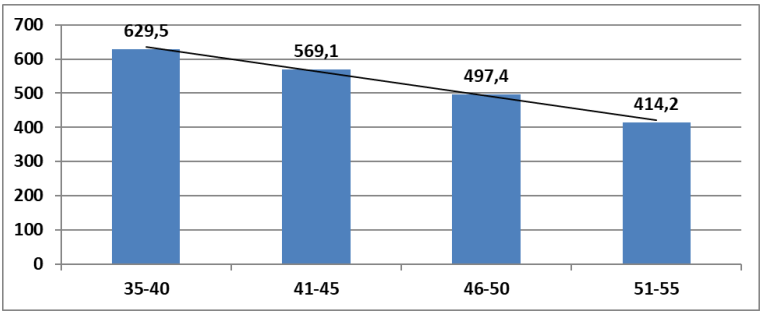

Figure 5. *Dynamics of age-related values of physical performance in women of the second mature age of the control group when practicing Nordic walking.*

PP in women MG at the age of 36-40 years was 9.53±0.47 kgm/min/kg, at the age of 41-45 years - 7.88±0.41 kgm/min/kg, at the age of 46-50 years – 6.82±0.36 kgm/min/kg, at the age of 51-55 years – 5.37±0.29 kgm/min/kg.

Studies have shown that MOC in ml/min/kg in women from the CG is higher in absolute values than in their peers from the MG. In women from the CG at the

age of 36-40 years, MOC was 39.99±1.07 ml/min/kg, at the age of 41-45 years - 35.47±1.02 ml/min/kg, at the age of 46-50 years – 32.19±0.96 ml/min/kg, at the age of 51-55 years – 28.78±0.94 ml/min/kg (Fig. 6).

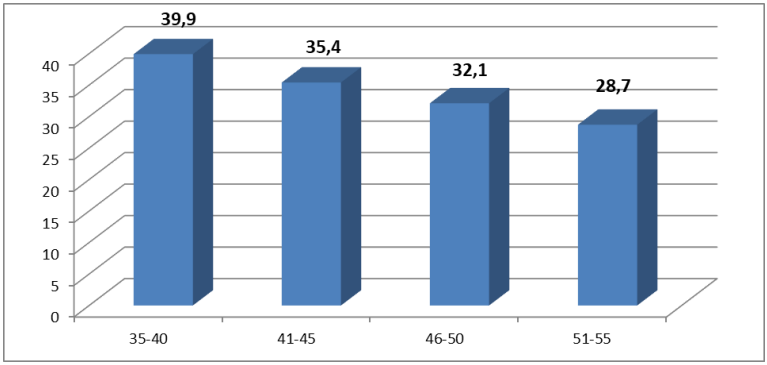

Figure 6. *Dynamics of age-related values of maximum oxygen consumption in women of the second mature age of the control group when practicing Nordic walking.*

In women MG, MOC in ml/min/kg, respectively, was: 38.16±1.19, 32.91±1.12, 30.80±0.98, 27.19±0.92 ml/min/kg (Fig. 7). It has been established that the use of the dominant A.A. Ukhtomsky does not significantly ($p>0.05$) affect MOC values in women with comorbid pathology.

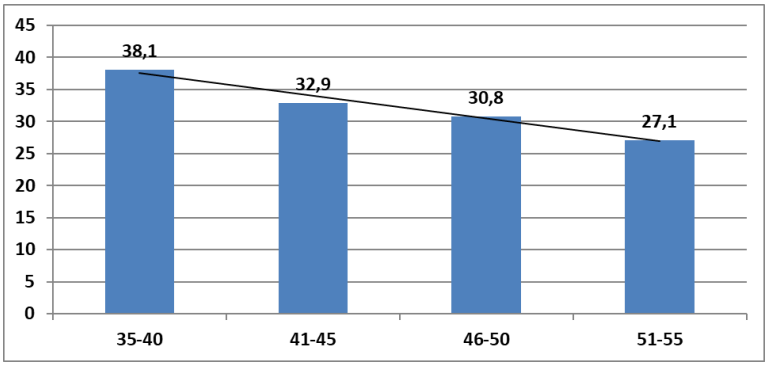

Figure 7. *Dynamics of age-related values of maximum oxygen consumption in women of the second mature age of the main group when practicing Nordic walking.*

Due to the increase in passport age, MOC has a significant ($p<0.05$) tendency to decrease. Thus, over the period from 36 to 55 years, BMD in women from the MOC decreased by 10.97 ml/min/kg in absolute values, and in women from the CG by 11.21 ml/min/kg.

Thus, the above indicates, firstly, the high practical value of the PWC 170 step test. Secondly, one should not discount such an important fact as the short time it takes to carry it out. It took us from 15 to 17 minutes to complete the PWC 170 step test for women. Thirdly, during the step test, a positive emotional impact was carried out according to the type of dominant A.A. Ukhtomsky. We noticed that the creation of a physiologically based, emotionally pleasant and relatively short-term dominant had a beneficial effect on the functional state of women and their PP.

Conclusions:

1. To assess the level of PP, you can and should use the easy-to-perform and valid step test PWC 170, which allows you to quickly and reliably monitor the functional state of the human body, especially with comorbid pathology. The study confirmed the hypothesis that comorbid pathology, firstly, significantly reduces the age-related functional capabilities of women, and secondly, more pronouncedly due to an increase in the passport age.

2. In clinical therapeutic practice, the period of human ontogenesis should not be considered as a single period (36-55 years), but divided into equal 5-year periods of life. This, in our opinion, will make it possible not only to individualize NW classes, but also to regularly conduct medical monitoring of the functional state of central hemodynamics during physical activity, taking into account the women's passport age.

3. PP and MOC in women of the second mature age with comorbid pathology significantly depend on their passport age. Positive physiologically determined verbal suggestion creates a dominant focus in the cerebral cortex, which allows you to increase the level of RF, but does not significantly increase oxygen consumption. When carrying out restorative treatment using NW, the doctor should keep in mind that as women increase in age, their PP and MOC decrease.

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互诫协会主导者的影响 UKHTOMSKY 关于秋明市患有合并症的第二成熟女性的肺活量：时间生物学方面

INFLUENCE OF THE DOMINANT OF A.A. UKHTOMSKY ON THE VITAL CAPACITY OF THE LUNG IN WOMEN OF THE SECOND MATURE AGE IN TYUMEN WITH COMORBID PATHOLOGY: CHRONOBIOLOGICAL ASPECTS

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抽象的。 文章首次展示了以互诫协会为主导的积极暗示的影响结果。 Ukhtomsky 进行了时间生物学研究，研究了一周中 8、12、16 和 20 小时的肺活量（VC、cm3）。 对居住在秋明州的 22 名患有共病的第二成熟年龄（49.3±3.5 岁）女性进行了检查。 使用日本制造的 HI-801 型胸部肺活量计评估肺活量。 我们将人类个体发生的第九个时期分为5个生命周期：36至40岁、41至45岁、46至50岁和

51至55岁。 研究表明，使用乌赫托姆斯基主导时，肺活量在白天和一周内显着增加，尤其是在 12 小时和 16 小时。 在个体发育的同一年龄期内，随着通行年龄的增加，呼吸系统的功能能力下降。

关键词：女性，第二成年期，共病病理，肺活量，时间生物学。

Abstract. *The article presents for the first time the results of the influence of positive suggestion as a dominant of A.A. Ukhtomsky for chronobiological study at 8, 12, 16 and 20 hours during the week of vital capacity of the lungs (VC, cm3). 22 women of the second mature age (49.3±3.5 years) with comorbid pathology living in Tyumen were examined. Vital capacity was assessed using a CHEST spirometer model HI-801 manufactured in Japan. We divided the ninth period of human ontogenesis into 5-year periods of life: from 36 to 40 years, from 41 to 45 years, from 46 to 50 years and from 51 to 55 years. It has been shown that vital capacity increases significantly during the day and week, especially at 12 and 16 hours, when using the Ukhtomsky dominant. As the passport age increases within the same age period of ontogenesis, the functional capabilities of the respiratory system decrease.*

Keywords: *women, period of the second adulthood, comorbid pathology, vital capacity of the lungs, chronobiology.*

Relevance. In recent years, the incidence of comorbid diseases has increased significantly [1, 2, 3, 4, 5, 6, 7, 8, 9, 10], which we associate with an increase in life expectancy and good clinical diagnosis. In the available literature, we have not found chronobiological studies reflecting the vital capacity indicator in women of the second mature age with comorbid pathology under the influence of simultaneous positive verbal suggestion to create the dominant A.A. Ukhtomsky against the backdrop of pleasant musical accompaniment.

Purpose: in women of the period of the second adulthood with comorbid pathology in chronobiological terms, study VC during the day and week under the influence of positive verbal influence to create the dominant A.A. Ukhtomsky in the context of using musical accompaniment.

Material and methods. We examined 22 women of the second adulthood (49.3±3.5 years) undergoing outpatient treatment at polyclinic No. 2 in Tyumen for comorbid pathology, including chronic coronary heart disease (CHD) without signs of heart failure, iron deficiency anemia (IDA) and diabetes mellitus (DM-2). The period of the second mature age, lasting 20 years, was conditionally divided into equal 5-year periods of life: from 36 to 40 years (38.4±1.4; n = 6), from 41 to 45 (43.1± 1.24; n = 6) years, from 46 to 50 (48.2±1.3; n = 5) years and from 51 to 55 (52.7±1.6; n = 5) years. This division, firstly, seems important to us from a functional point of view and, secondly, from the standpoint of tactics for developing restorative treatment.

All women underwent a comprehensive assessment of the functional state of the respiratory and cardiovascular systems in a state of physiological rest and after dosed physical activity. In this message, we share only the results of a chronobiological study of VC at rest during the day and week with the creation of the dominant A.A. Ukhtomsky through a positive 10-minute verbal hypnotic suggestion against the background of pleasant musical accompaniment. VC was determined using a CHEST spirometer model HI-801 manufactured in Japan.

When applying the dominant of Academician A.A. Ukhtomsky, we proceeded from the fact that the human brain, while awake, works on certain algorithms that require constant updating. We hypothesized that the process of updating neural connections in the brain will be better if it is stimulated using breathing accompanied by music and verbal hypnotic suggestion to create a dominant according to A.A. Ukhtomsky. An unresolved issue in this situation is the identification of individual characteristics of physiological adaptation of women aged 36 to 55 years with complex somatic pathology by studying the functional age-related capabilities of the respiratory system by assessing VC from the dominant position of Academician A.A. Ukhtomsky.

For this purpose, to the pleasant musical accompaniment chosen by the woman (most often “Rondo Alla Turca” - “Turkish Rondo”) V.A. Mozart calmly convinced her for 10 minutes that she could increase her VC without much effort and without visible tension, that is, playfully.

We made the assumption that, albeit short in time, but precisely the positive nature of suggestion against the background of musical accompaniment, can be that irritant for the brain, which, in accordance with the teachings of Academician A.A. Ukhtomsky about the dominant, programs it for more pronounced and time-stable preservation of the function of the respiratory system.

The research results were processed on a personal computer using modern electronic programs (STATISTIKA). The significance of differences was assessed using Student’s t test.

The principles of voluntariness, individual rights and freedoms guaranteed by Articles 21 and 22 of the Constitution of the Russian Federation, as well as Order of the Ministry of Health and Social Development of Russia No. 774n of August 31, 2010 “On the Ethics Council” are observed. The study was conducted in accordance with the ethical standards set out in the Declaration of Helsinki and the European Community Directives (8/609EC) and the informed oral consent of the women.

Results and discussion. By observing the protective regime in the clinic, we sought to protect women as much as possible from external negative influences. When studying the resistance of women to hypoxia, we, firstly, explained to them not only the methodology and progress of each study, but also their practical im-

portance for treatment. Secondly, we were taught to use the CHEST spirometer model HI-801. Thirdly, they showed normative values of vital capacity.

Chronobiological determination of vital capacity in women indicated that it changes significantly ($p<0.05$) during the day and week (Table 1) due to the use of positive verbal suggestion against the background of music (mainly V.A. Mozart).

Table 1.

Chronobiological indicators of vital capacity of the lungs in women 36 - 55 years old on Monday in a state of physiological rest (I) and after combined (II) positive suggestion and music (M±m)

Time	Age			
	36-40 n = 6	**41-45 n = 6**	**46-50 n = 5**	**51-55 n = 5**
8 hours	I. 2,227±0,109 II. 2,493±0,112 Increase 0,266	I. 2,221±0,111 II. 2,484±0,115 Increase 0,263	I. 2,209±0,108 II. 2,471±0,116 Increase 0,262	I. 2,198±0,102 II. 2,459±0,115 Increase 0,261
12 hours	I. 2,233±0,110 II. 2,499±0,111 Increase 0,266	I. 2,228±0,112 II. 2,493±0,110 Increase 0,265	I. 2,221±0,109 II. 2,485±0,115 Increase 0,264	I. 2,193±0,103 II. 2,461±0,113 Increase 0,263
16 hours	I. 2,240±0,112 II. 2,508±0,118 Increase 0,268	I. 2,237±0,115 II. 2,504±0,120 Increase 0,267	I. 2,226±0,109 II. 2,488±0,115 Increase 0,262	I. 2,191±0,103 II. 2,452±0,114 Increase 0,261
20 hours	I. 2,216±0,112 II. 2,479±0,116 Increase 0,263	I. 2,210±0,112 II. 2,472±0,118 Increase 0,262	I. 2,197±0,108 II. 2,458±0,114 Increase 0,261	I. 2,184±0,107 II. 2,443±0,115 Increase 0,259
Average values	I. 2,229±0,112 II. 2,495±0,114	I. 2,224±0,112 II. 2,488±0,115	I. 2,213±0,108 II. 2,475±0,115	I. 2,191±0,103 II. 2,453±0,114

As the passport age increased over the period from 36 to 55 years, vital capacity at 8 o'clock in the morning decreased by 0.029 cm^3, at 12 o'clock in the afternoon - by 0.040 cm^3, at 16 o'clock in the afternoon - by 0.049 cm^3, at 20 o'clock - by 0.032 cm^3. At the same time, it should be noted that positive verbal suggestion against the background of music led to an almost identical increase in vital capacity. Thus, the level of the average value (mesor) of vital capacity in women examined in a state of physiological rest on Monday was significantly ($p<0.05$) lower than after a combined positive suggestion against the background of music.

The amplitude of fluctuations in vital capacity during the day was in a state of physiological rest from 2.184 to 2.508 cm^3, which we explain, firstly, by the stability of the functioning of the respiratory system; secondly, the presence of comorbid pathology, to one degree or another affecting the function of external respiration. Thirdly, a low level of physical activity due to comorbidity. As for vital capacity immediately after using the Ukhtomsky dominant, you can pay at-

tention to two points. Firstly, the vital capacity mesor during the day in all women was significantly ($p<0.05$) higher than in a state of physiological rest. Secondly, in absolute values it was at the level of identical numbers (Fig. 1).

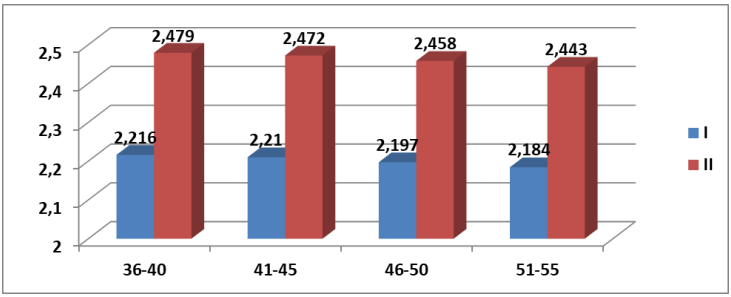

Figure 1. *The level of the average value (mesor) of vital capacity in women of the second mature age during the day on Monday in a state of physical rest (I) and after using the Ukhtomsky dominant (II).*

Table 2.

Chronobiological indicators of vital capacity of the lungs in women aged 36 to 55 years on Wednesday in a state of physiological rest (I) and after combined (II) positive suggestion and music (M±m)

Time	Age			
	36-40	41-45	46-50	51-55
8 hours	I. 2,231±0,109 II. 2,496±0,112 Increase 0,265	I. 2,227±0,111 II. 2,491±0,115 Increase 0,264	I. 2,216±0,108 II. 2,479±0,116 Increase 0,263	I. 2,202±0,102 II. 2,463±0,115 Increase 0,261
12 hours	I. 2,239±0,110 II. 2,505±0,111 Increase 0,266	I. 2,231±0,112 II. 2,496±0,110 Increase 0,265	I. 2,228±0,109 II. 2,490±0,115 Increase 0,262	I. 2,198±0,103 II. 2,460±0,113 Increase 0,262
16 hours	I. 2,244±0,112 II. 2,507±0,118 Increase 0,263	I. 2,237±0,115 II. 2,498±0,117 Increase 0,261	I. 2,231±0,109 II. 2,491±0,115 Increase 0,259	I. 2,197±0,103 II. 2,458±0,114 Increase 0,261
20 hours	I. 2,232±0,112 II. 2,493±0,116 Increase 0,261	I. 2,223±0,112 II. 2,482±0,118 Increase 0,259	I. 2,214±0,108 II. 2,471±0,114 Increase 0,257	I. 2,198±0,107 II. 2,456±0,115 Increase 0,258
Average values	I. 2,236±0,110 II. 2,501±0,114	I. 2,229±0,112 II. 2,491±0,114	I. 2,222±0,108 II. 2,482±0,115	I. 2,198±0,103 II. 2,459±0,114

Analyzing the chronobiological indicators of VC in women on the average day of the week, it can be noted that there are no significant differences ($p>0.05$) in comparison with the indicators obtained on Monday (Fig. 2).

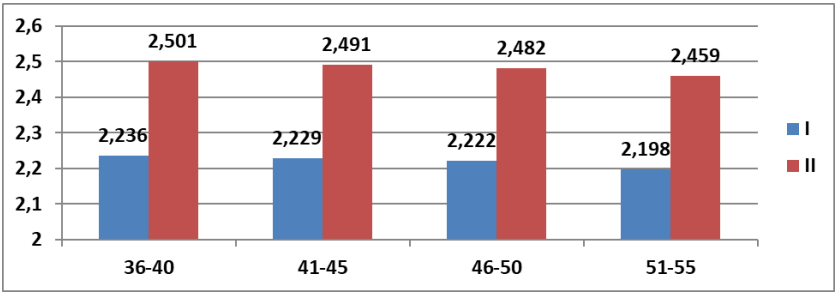

Figure 2. *The level of the average value (mesor) of vital capacity in women of the second mature age during the day on Wednesday in a state of physical rest (I) and after using the Ukhtomsky dominant (II).*

Table 3.

Chronobiological indicators of vital capacity of the lungs in women 36 - 55 years old on Friday in a state of physiological rest (I) and after combined (II) positive suggestion and music (M±m)

Time	Age			
	36-40	41-45	46-50	51-55
8 hours	I. 2,219±0,108 II. 2,487±0,112 Increase 0,268	I. 2,213±0,110 II. 2,479±0,113 Increase 0,266	I. 2,202±0,108 II. 2,466±0,114 Increase 0,264	I. 2,187±0,102 II. 2,448±0,115 Increase 0,261
12 hours	I. 2,227±0,111 II. 2,492±0,114 Increase 0,265	I. 2,218±0,112 II. 2,482±0,114 Increase 0,264	I. 2,209±0,109 II. 2,472±0,117 Increase 0,263	I. 2,193±0,103 II. 2,454±0,113 Increase 0,261
16 hours	I. 2,234±0,112 II. 2,501±0,117 Increase 0,267	I. 2,221±0,115 II. 2,487±0,118 Increase 0,266	I. 2,211±0,109 II. 2,474±0,116 Increase 0,263	I. 2,186±0,103 II. 2,446±0,114 Increase 0,260
20 hours	I. 2,211±0,112 II. 2,476±0,118 Increase 0,265	I. 2,202±0,112 II. 2,466±0,115 Increase 0,264	I. 2,191±0,108 II. 2,453±0,113 Increase 0,262	I. 2,178±0,107 II. 2,436±0,115 Increase 0,258
Average values	I. 2,222±0,113 II. 2,489±0,114	I. 2,213±0,112 II. 2,478±0,115	I. 2,203±0,108 II. 2,466±0,115	I. 2,186±0,103 II. 2,446±0,114

When assessing the values of vital capacity during the daylight hours on Friday, we note that we did not identify any significant differences in comparison with the previous days of the week ($p>0.05$). As on other days of the week, vital capacity after using the Ukhtomsky dominant was significantly ($p<0.05$) higher in comparison with the state of physiological rest (Fig. 3).

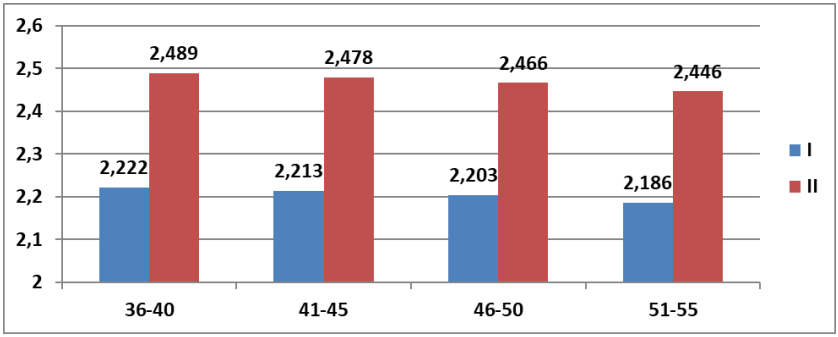

Figure 3. *The level of the average value (mesor) of vital capacity in women of the second mature age during the day on Friday in a state of physical rest (I) and after using the Ukhtomsky dominant (II).*

Thus, based on the study, we can conclude that an increase in the passport age approaching the elderly and the presence of comorbid pathology contribute to a decrease in the resistance of the female body to hypoxia. We state that when conducting a chronobiological study of vital vital capacity in a state of physical rest during the day and week, the use of the Ukhtomsky dominant in the form of a positive verbal hypnotic suggestion against the background of music contributes to its significant increase, even despite the presence of complex comorbid pathology. Chronobiological study of VC during the day and week allows us to conclude that at 12 and especially at 16 o'clock in the afternoon the respiratory system operates in a mode of greater functionality, which should be taken into account when carrying out the treatment process. As the passport age increases within the same age period of ontogenesis, the functional capabilities of the respiratory system of women decrease.

Conflict of interest. The authors declare no conflict of interest.

Research transparency. The study had no sponsorship. The authors are solely responsible for submitting the final version of the manuscript for publication.

Declaration of financial and other relationships. All authors participated in the development of the topic, study design and writing of the manuscript. The final version of the manuscript was agreed upon and approved by all authors. The authors received no royalties for the study.

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热处理弹簧钢的抗断裂强度的提高
THE INCREASE OF FRACTURE RESISTANCE OF HEAT-TREATED SPRING STEELS

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抽象的。 研究了采矿工程用钢板热处理弹簧钢 C0.65Mn 和 C0.60Si2Ni2 的性能。 测试时，冲击样品上有裂纹和圆形切口。 分析了两种热处理方式后钢的组织变化：传统的——回火淬火和推荐的——等温淬火。

研究揭示了断裂性质对钢结构的依赖性，以及相应的热处理类型的依赖性：等温处理样品中的间歇裂纹扩展和淬火和中等回火后样品中的单调扩展。 结果表明，断裂特征与等温淬火后钢中残余奥氏体的不稳定以及裂纹尖端应力引起的马氏体转变有关。

关键词：弹簧钢、变形、相结构、抗裂性、热处理、弹性。

Abstract*. The properties of sheet heat-treated spring steels C0.65Mn and C0.60Si2Ni2 for mining engineering where investigated. Impact samples with a crack and with a round incision where tested. The change in the structure of steels after two types of heat treatment where analyzed: traditional – quenching with tempering and recommended – isothermally quenching.*

Studies have revealed the dependence of the nature of the fracture on the structure of the steels and, accordingly, on the type of heat treatment: intermittent crack growth in isothermally treated samples and monotonic growth – in samples after quenching and medium tempering. It is shown that the features of fracture are associated with the instability of the retained austenite present in the steel after isothermally quenching, as well as with the martensitic transformation caused by stresses at the crack tip.

Keywords: *spring steel, deformations, phase structure, crack resistance, heat treatment, elasticity.*

Introduction

In mining engineering the springs made of low-alloy heat-hardened sheet steels of the C0.65Mn, C0.55CrMnB and C0.60Si2 types are widely used. Working lev-

el of springs resistance to small plastic deformations is achieved by heat treatment including quenching and medium tempering. As a result of such processing, steel acquires troostit structure with tensile strength σ_b > 1400 MPa. However, steels with this structure have a low resource of ductility and impact strength, which makes them prone to brittle fracture. As an alternative to these steels, currently, more alloyed steels, such as C0.60Si2Ni2, are becoming widespread due to the increasing loads of mining equipment. At the same time isothermally quenching on the lower bainite is used, because it is the type of heat treatment which provides a higher level of impact strength an ductility.

In production, the control of the fracture resistance of steels after heat treatment is usually not provided, and the level of fracture characteristics in the literature is not sufficiently covered. At the same time, the tendency of springs to fracture is enhanced by the high level of acting stresses in modern mining equipment, which reach the yield strength of steel.

The purpose of this research is to study the fracture resistance (including the crack resistance) of sheet steels C0.65Mn and C0.60Si2Ni2 both with the structures of tempering troostite (after quenching to martensite and medium tempering) and lower bainite (after isothermally quenching) at the strength level recommended for the manufacture of springs.

Research methods and the results

The objects of the study are made of C0.65Mn and C0.60Si2Ni2 steels, the chemical composition of which is given in the Table 1.

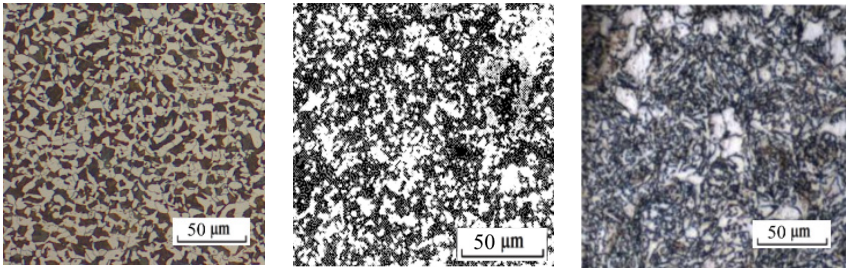
Table 1.

Chemical composition of steels: C0.65Mn and C0.60Si2Ni2

Steel	Element content, wt. %							
	C	Mn	Si	Ni	Cr	Cu	S	P
					no more than			
C0.65Mn	0.62-0.70	0.90-1.20	0.17-0.37	0.20-0.25	0.25	0.20	0.035	0.035
C0.60Si2Ni2	0.56-0.64	0.40-0.70	1.45-1.85	1.45-1.75	0.30	0.20	0.025	0.025

Heating for quenching was carried out in a chamber electric furnace with an air atmosphere according to standard modes ($t = A_3$+30°C, cooling in oil). Tempering was carried out at a temperature t = 280…470°C in a chamber electric furnace with cooling in oil. Heating for isothermally quenching was performed in a salt bath, followed by shift to an alkaline one for isothermally aging. The holding time was 15…20 *min*.

The microstructure was examined with a «*Neofot-3*» optical microscope, and the structure of the fractures was magnified up to ×50 with an *MBS* microscope. The structure of steels in the initial state is a mixture of ferrite and perlite (Fig. 1, *a*).



a *b* *c*

Figure 1. *Microstructure of steels C0.65Mn (×450): a – initial state; b – quenching and tempering at t = 400°C; c – isothermally quenching with exposure at t = 320°C*

The structure of hardened and tempered steel consists of tempering troostite (Fig. 1, b), and isothermally hardened steel – of fine-dispersed lower bainite and residual austenite, the content of which was about 10-12 % (Fig. 1, c).

Stress intensity coefficients of two types were determined on samples with a pre-induced fatigue crack: at the crack start (initial) K_i and conditional critical K_c. The tests (Fig. 2) were carried out by off-centric stretching according to the method [1].

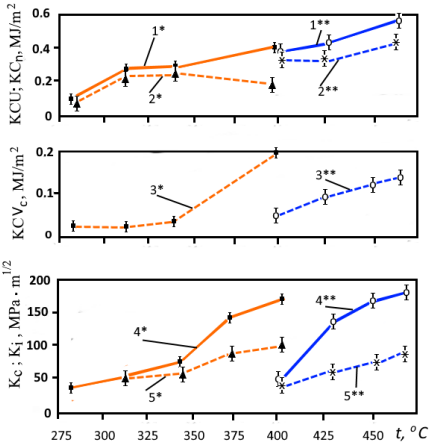


Figure 2. *The influence of tempering temperature t on the properties of steels C0.65Mn (*) and C0.60Si2Ni2 (**): 1 – the impact strength KCU; 2 – the specific work of the crack nucleation KC_n; 3 – the specific work of fracture with a crack KCV_c; 4 – stress intensity coefficient conditional critical K_c; 5 – stress intensity coefficient at the crack start (initial) K_i*

The thickness of the samples was equal to the thickness of the sheet (tape) and was 2.5 *mm* for steel C0.60Si2Ni2 and 3.0 *mm* for steel C0.65Mn. The specific work of fracture of samples with a crack – KCV_c, was determined on prismatic impact samples with a V-shaped incision ending by a fatigue crack.

The impact strength of the samples with a standard U-shaped incision – *KCU* and the specific work of the crack nucleation – KC_n (by the *KCU* - KCV_c difference) were also established. In all cases, the direction of crack growth during fracture was perpendicular to the direction of the rolled sheet.

Tests of samples subjected to standard heat treatment (quenching + tempering) showed that all characteristics monotonically rise with increasing tempering temperature (see Fig. 2). The values of the impact strength of samples with a round incision – *KCU*, in the tempering temperature range are**:** 0.4…0.6 MJ/m^2 for steel C0.60Si2Ni2, and 0.1…0.4 MJ/m^2 for steel C0.65Mn. These values are close (steel C0.60Si2Ni2) and below (steel C0.65Mn) the level of 0.5...0.6 MJ/m^2, conditionally accepted as a threshold value that ensures the absence of brittle destruction of structural materials.

Thus, the high risk of brittle fracture of steels hardened by quenching with tempering is confirmed. The specific work of fracture of samples with a crack – KCV_c does not exceed 20 ... 30 % of the value of the impact strength with a round incision *KCU*.

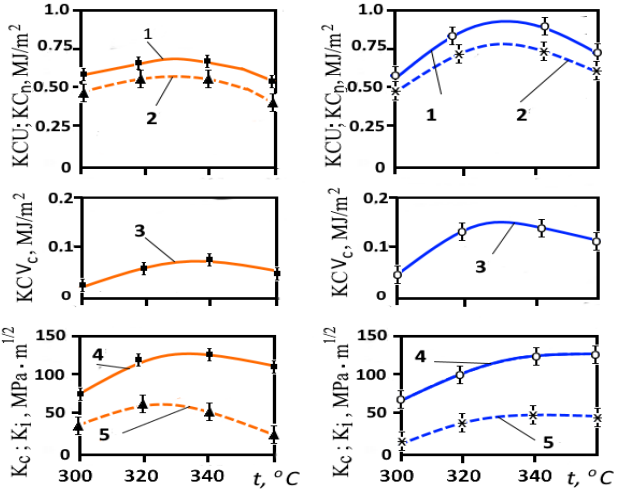
Tests for off-centric stretching of samples with a crack showed an increase in the crack resistance of quenching steels with an increase in the tempering temperature. The values of the obtained characteristics for the two studied steels were similar (see Fig. 2).

The patterns of change in characteristics of both steels treated according to the second method - by isothermally quenching - are different. For isothermally treated steels, the impact strength of samples with a round incision *KCU*, the specific work of fracture of samples with a crack KCV_c, and the specific work of the crack nucleation KC_n in the conversion interval of t = 300...350°C vary along the curve with a maximum at t = 320...330°C (Fig. 3). The *KCU* values after isothermally quenching of both C0.65Mn and C0.60Si2Ni2 steels are 50 ... 80 % higher than after standard quenching with tempering. Thus, the *KCU* of C0.60Si2Ni2 steel reaches 0.8 MJ/m^2 versus 0.5 MJ/m^2 when quenched with tempering, and the *KCU* of C0.65Mn steel reaches 0.6 MJ/m^2 versus 0.3 MJ/m^2.

However, the specific work of fracture of samples with a crack KCV_c remains low ≈ 0.1 MJ/m^2 for both heat treatment options. At the same time, steel C0.60Si2Ni2 has higher values of the discussed values than steel C0.65Mn, as in the case of quenching with tempering (see Fig. 3).

The stress intensity coefficients of two types: at the crack start (initial) K_i and conditional critical K_c of C0.65Mn and C0.60Si2Ni2 steels increase with a rise of

the temperature of isothermally transformation to t = 320...330 °C (see Fig. 3). At the same time, the closeness values of the characteristics of the studied steels are noted. However, at isothermally transformation temperature of t = 350°C, a decrease in the crack resistance characteristics for C0.65Mn steel is observed. For steel C0.60Si2Ni2 at temperatures in the range of t = 320...350°C the crack resistance characteristic is not reduced.



a *b*

Figure 3. *The influence of isothermally transformation temperature t on the properties of steels C0.65Mn (a) and C0.60Si2Ni2 (b): 1 – the impact strength KCU; 2 – the specific work of the crack nucleation KC_n; 3 – the specific work of fracture with a crack KCV_c; 4 – stress intensity coefficient conditional critical K_c ; 5 – stress intensity coefficient at the crack start (initial) K_i*

Discussion of the results

The results of the study show that C0.65Mn and C0.60Si2Ni2 steels, heat-treated in two different ways, have different levels of fracture resistance too. Thus, the impact strength of samples with a round incision of quenched and tempered steels on the troostite structure is 30...80% less than after isothermally treatment on the bainite structure at the same strength level. This advantage is well known and has often been used as an argument when choosing a method for heat treatment of not only springs, but also other structural parts: bolts, rods, levers [2, 3]. However, the specific work of fracture of samples with a crack KCV_c after quenching with tempering of steels is either greater than that of isothermally treated ones, or they have similar values.

Therefore, the fracture resistance of steels depends not only on the structure formed during the heat treatment, but also on the stress concentration. Obviously, the reason for this difference lies in the structural features of heat-treated steels. As known [4, 5], the structure of tempered steels consists of troostite – a fine mixture of ferrite and cementite. The structure of the steels after isothermally quenching contains bainite and residual austenite.

As a result, the structure of isothermally hardened steel is characterized by incomplete processes, nonequilibrium and thermodynamic instability, in contrast to the structure of the tempering troostite obtained by the first treatment option.

It can be assumed, that as a result of the action of stresses at the crack tip, under conditions of constrained deformation, two processes may occur. The first is associated with the transformation of residual austenite into martensite [6-8]. The transformation of residual austenite as a result of plastic deformation of structural steel C0.30Cr2Ni2MoV with a bainite structure was also considered in [9-11]. The second possible process is the destruction, as a more brittle phase, of those martensitic sites in which carbide formation is not completed.

According to the literature data [12-16], residual austenite causes an increase in the values of impact strength, plasticity, and also a lower sensitivity to incision and cracks. It should be noted that these data were obtained on standard smooth samples under tension, without a cut, or with an insufficiently rigid stress concentrator. The results of this study do not contradict these data, since they take into account the type of concentrator [17-20]. Studies have shown a different pattern of crack development after the two treatment options. An intermittent, abrupt crack growth was found in isothermally quenched steels C0.65Mn and C0.60Si2Ni2. Monotonous crack growth after quenching with medium tempering is noted.

In more severe operating conditions, as well as in the presence of other factors that lead the part to the stage of work with a microcrack or crack-like defect, the fracture resistance of isothermally treated steels will decrease. Such factors include: design defects-stress concentrators, hydrogen embrittlement, large cross-sections, as well as a high level of active stresses.

Conclusion

The fracture resistance of heat-treated steels C0.65Mn and C0.60Si2Ni2 is determines by the features of the structure formed during heat treatment. It is reduced in the presence of sharp stress concentrators of the crack type. An intermittent, abrupt crack growth was found in isothermally quenched steels C0.65Mn and C0.60Si2Ni2. Monotonous crack growth after quenching with medium tempering is noted. At the same time, the crack resistance indicators are higher after isothermally quenching with exposure at $t = 320...340^{o}C$. The analysis of the structure indicates that the greater resistance to crack development in isothermally quenched steel is caused by the presence of residual austenite and its influence on the stress

change at the crack tip. The use of C0.60Si2Ni2 steel is more preferable for more loaded springs of mining equipment.

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论顿涅茨克次区域边界内的北亚速地区形态雕塑的代表性

ON THE REPRESENTATIVENESS OF MORPHOSCULPTURES OF THE NORTHERN AZOV REGION WITHIN THE BOUNDARIES OF THE DONETSK SUBREGION

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抽象的。 这项工作研究了顿涅茨克亚速地区领土的领土和自然多样性，建立在具有遗传代表性的景观关键之上。 出于进一步区域概括的目的，突出显示了该次区域的形态雕塑。 考虑到地貌形成方法，提出了对顿涅茨克地区南部暴露的当地景观异国风情的不同理解。

关键词：景观多样性、形态雕塑、自然领土综合体、亚速海。

Abstract*. The work examines the territorial and natural diversity of the territory of the Donetsk Azov region, built on genetically representative landscape keys. The morphosculptures of the subregion are highlighted for the purpose of further regional generalization. Taking into account the geomorphogenic approach, a differential understanding of the local landscape exoticism of the southern exposure of the Donetsk region is proposed.*

Keywords: *landscape diversity, morphosculptures, natural-territorial complexes, Azov Sea.*

The patterns of differentiation of the landscape envelope have long attracted the attention of researchers. The doctrine of landscape zones, developed by domestic scientists of the Dokuchaev school, was widely recognized, which was intended to become an important step towards understanding territorial physical and geographical differentiation, and as a result, was the development of landscape theory. Hence the concepts of geographic zonality, regional and morphological differentiation of natural-territorial complexes, and their typological features that have become established in modern physical geography.

Geostructural features also determine the main features of the geological structure: the low thickness of the sedimentary cover within the ledge of the foundation and its increase to the south as the foundation subsides, the participation in the

relief formation of the northern outskirts of the Donetsk Azov region of karsting rocks (Devonian dolomites) within the elevated local blocks of the junction zone of the Azov region and Donbass . The geomorphological factor is the most effective among the factors of physical-geographical differentiation due to the non-mediated nature of its landscape-forming influence and the significance of the natural component on which this influence is directed - the morpholithogenic basis.

Developing in direct dependence on the direction of neotectonic movements, the geomorphological factor predetermined the processes of landscape formation by the very genetic type of the original relief: with the intensive upward development of morphostructures, a predominantly denudation morphosculpture was formed; with slow upward development and subsidence, local accumulative components were significant. In accordance with this, the formation of the horizontal structure of natural-territorial complexes occurred differently.

The result of the diverse superposition of interdependent developing geological and geomorphological factors, different genetics, but associated with the formation of a single morpholithogenic substrate, was the process of gradual complication of the landscape-forming role of the relief. Along with this, it is necessary to note the effect of such complication created by the great morphological activity of younger, better preserved structural and sculptural forms of relief, each of which is reflected in the hierarchy of modern natural-territorial complexes.

The work of rivers and temporary streams plays the greatest role in the formation of morphosculptural elements. They create widespread fluvial (erosive and accumulative) forms (river valleys, ravines, ravines, etc.). External processes on land are largely determined by the climatic and geomorphological features of the area, and therefore the areas of distribution of morphosculptures of a certain type are distributed over the Earth's surface quite regularly. On the seabed, morphosculptures are formed under the influence of coastal abrasion-accumulative processes, the activity of turbidity (suspension) flows, the influence of bottom currents, etc.

One should also dwell on those types of morphosculptures within the landscape scheme of the Donetsk Azov region, which play a leading role in terms of aesthetic appeal (landscape) and influence the formation of the ecological system at the subregional level.

Sea of Azov. The Sea of Azov is located within the Scythian plate. The bottom is a gently sloping accumulative plain, decreasing to the south.

The increasing pace of the Black Sea transgression led to the intensive development of abrasion processes, and its slow decline led to a significant accumulation of sediments in the coastal zone.

Located on the southern edge of the Russian Plain, the Sea of Azov is deeply cut into the land and belongs to the type of inland seas, but it is not a closed sea

basin, but connected to the World Ocean. The Sea of Azov is the smallest and shallowest of the seas on the globe, surrounded on almost all sides by land and lying in temperate latitudes, causing a continental climate [2]. In the northeastern part it forms a narrow, shallow, desalinated Taganrog Bay, protruding far into the land. The northern coast is characterized by sand spits extending to the southwest.

According to its morphological characteristics, it belongs to the flat seas and is a shallow body of water with low coastal slopes. The Sea of Azov, deeply cut into the land, is a type of inland sea; in terms of its distance from the ocean to the mainland, it is the most continental sea on the planet. It has relatively simple outlines, relatively uniform shores and a fairly simple bottom topography.

The Sea of Azov is shallow. The bottom of the sea is very flat, almost everywhere covered with silt, only sandbanks extend from the spits. In some places there are so many bivalves and other invertebrates that the main component of the bottom soil is shell rock. Some areas of the bottom are covered with algae. In summer, in deeper places - pits - there is black silt, with the smell of hydrogen sulfide [3].

Based on the nature of modern sedimentation in the Sea of Azov, an area of intense sediment accumulation, a zone of material transit and weak accumulation, and a zone of stable erosion are distinguished. Bottom sediments are mainly composed of clayey silt, silty silt, silty sand and sand. Along the coast there is a wide strip of sandy soils with an admixture of shells [5].

A feature of the modern dynamics of the shores of the Azov Sea is the predominance of abrasion and the local nature of accumulation. Not only the primary shores, but also the accumulative forms are subject to erosion.

The coast within the subregion is characterized by the presence of two low and long shallow sand spits, extending mainly from the north and northeast to the south and southwest, and the ends of the spits bend to the west [4].

Shores. The current state of the coast is characterized by the predominance of abrasion processes that destroy the mainland part of the coast at an average speed of 1 meter per year until 2021 inclusive, and 2 meters per year in 2022 and 2023, actively manifesting itself in areas where the coastal slope is directly exposed to waves.

A special feature of the northern coast of the Sea of Azov is a highly sinuous coastline with a system of large and small-bladed elements - accumulative spits. Two of them – Krivaya and Belosarayskaya – are located in the Donetsk Azov region.

From the point of view of the geological structure, the spits are very young formations. They are a product of complex accumulation of marine alluvium and partly the removal of rivers and gullies - sand, shells and coastal abrasion materials. In the root part they have pebbles, in the apical part the shell predominates

over the sand, and along the western part there is a strip of pure shell, and therefore the accumulative forms are very sensitive to disturbances in the reserves of biogenic material on the underwater slope [6].

Between the spits and the main shore, the sea forms open bays, bays and estuaries. If we exclude the alluvial spits, then the entire rest of the coast is a flat steppe, mostly descending steeply to the sea. The spits and narrow coastal strip are composed mainly of Quaternary marine sediments. To the north, the plain is composed of loess, loess-like loams and clays of the late glacial period.

Braids. ***The crooked spit*** extends 7 km into the sea and is shaped like a saber. Its root part has a triangular shape, the eastern shore, the western shallows. The eastern side has a rather steep slope, while on the western side there are small bays overgrown with reeds, reeds and cattails.

On the spit you can find salt marshes, small lakes and estuaries. The latter are flooded with water in winter, dry out in spring and summer and are overgrown with grass. The spit is connected to the mainland by narrow isthmuses composed of sand and shell sediments and bordered on the sea side by a surf wall.

The sandy-shell beaches of the Krivoy Spit arrow are mosaically overgrown with shrubs and reeds. The northern shore of the spit is continental. The eastern one is formed by the Crooked Spit, the length of which along the eastern coast reaches up to 7 kilometers. The crooked spit is a young formation, has an accumulative origin and is unstable in size. The basis for its formation is marine alluvium, river outfalls and gullies (sand, shell and material from coastal abrasion). The root part is composed mainly of pebbles, the top part is composed of shells and sand, while the western shore is composed of shells. The west coast is quite rugged. There are numerous small bays and coastal shallow lakes, muddy islands. On Krivaya there are sand and shell beaches, salt marshes and littoral swamps, and low-grass areas. A feature of the geomorphology of Krivaya Spit is the presence of a large estuary at its base.

The Belosarayskaya spit is a young sea spit of accumulative origin. The basis of its formation is marine alluvium, river and gullies (sand, shell, coastal abrasion material). The root part of the spit is composed predominantly of pebbles and sand, the top part is composed of sand and, to a lesser extent, shells, and in the inland and coastal parts there is more humified and silty soil.

Thanks to alluvial processes, the spit constantly varies in size. At the moment, the width of its base is 12 kilometers, and its length is just over 15. The base of the spit is adjacent to a steep, high continental ledge. The end of the braid is bent to the northeast and forms the so-called “zendzyk”.

The Belosarayskaya Spit is characterized by the following relief forms: 1) littoral strip; 2) littoral swell; 3) shell-sandy beach, 4) sandy steppe. In general, the height of the spit does not exceed 3 meters above sea level. The relief is flat

and slightly undulating, with sand dunes found in the elevated eastern part. The central part is low. There are numerous closed shallow estuaries extending from the northwest to the southeast, wet salt marshes, salt marshes and meadows. The western coast of the Belosarayskaya Spit is marshy and covered with reed thickets. Elements of the coastal landscape are represented by islands and shallow waters, freshwater estuaries and shallow lakes. In the valley of the Mokraya Belosarayka River, which flows into the Belosaraysk Bay, there are estuarine complexes with an area of about 300 hectares.

Sea terraces. The relief forms of the coastal zone, created by the sea at a relatively lower or higher level compared to the modern one, form marine terraces. Accumulative, abrasion and basement (accumulative-abrasion) terraces take part in the orography of the territory. Accumulatives are either ancient coastal accumulative forms or elevated areas of the former coastal seabed. Abrasion - the remains of ancient bottom surfaces rising above the modern sea level, produced by abrasion [3].

Geomorphologically, in the Northern Azov region, Pliocene-Pleistocene plains with ravine-gully dissection are developed. The watershed plateau is a stratified plain; in the coastal part it gives way to accumulative and marine plains. The latter are formed by a complex of high Pleistocene terraces and stretch in a narrow strip along the coast. Within the park's boundaries their width is 2-3 kilometers. Here, abrasion-landslide banks with cliff heights of up to 35-40 meters predominate, alternating with accumulative spits. The coastal ledge is strongly dissected by ravines and gullies, and the presence of hanging channels indicates a high rate of abrasion.

Rivers. Within the waters of the Donetsk subregion, both large rivers (Kalmius) and a number of small rivers flow into the Sea of Azov. Originating in the spurs of the Donetsk Ridge, the rivers Kalchik, Gruzskoy Elanchik, Kamyshevatka, Mokraya Belosarayka, Sukhaya Belosarayka, Zelenaya, Mokraya Bedra, Karatyuk and Temryuk carry their waters into the sea. In terms of their regime, rivers of southern exposure are of the lowland type, predominantly rain-fed, with groundwater being of secondary importance. They are characterized by weakly expressed spring floods, low summer low water, which is interrupted in some years by rain floods, and slightly elevated levels in autumn as a result of rains and in winter due to thaws. In summer, small rivers dry up. Aeolian processes occurring at the mouths of rivers, the first and second terraces of which are composed of alluvial sands, cause the transfer of river sands to beaches and spits.

Bays, estuaries, lagoons, lakes. Natural bodies of water are concentrated mainly along the sea coast and between the spits. These are bays, estuaries, lagoons and lakes. Their area varies greatly depending on hydrological conditions, and during dry periods they dry out almost completely. The freshwater lakes located here are very small in size.

Lagoons, often called estuaries, deserve special attention; they are shallow bodies of water separated from the sea by a narrow strip of washed-up sand (bar). Due to their protection, lagoons are unique natural biotopes. They serve as a shelter for aquatic birds, fish and animals.

A significant number of shallow artificial reservoirs have been created in the mainland part of the region.

A peculiarity of the geomorphology of Krivaya Kosa is the presence of the large Krivokossky estuary at its base. Its water regime is formed by tidal phenomena, and its hydrochemical characteristics are determined by the surface runoff of Shiroka Balka and underground water supply from the bedrock shore. Currently, there is a slow process of degradation of the reservoir (siltation and overgrowth), the main reason for this is the desire to limit the influence of the estuary on the adjacent territories by laying dams on the northern and western sides of the estuary. The construction of a canal for its connection with the sea from the eastern side has lost its relevance today, since the rate of siltation has significantly exceeded the rate of construction of structures [4].

Plavni, swamps. The visual appearance of the coastal part has the typical and characteristic features of a floodplain landscape, namely: flat, usually treeless, grassy spaces with water mirrors. A significant part of the floodplains is occupied by more or less dense thickets of reeds, cattails or reeds and plant associations. The thickets are interrupted by lakes and watercourses.

Plavni is the only natural-historical landscape of the Northern Azov region where large tracts of natural vegetation are still preserved. Being located in the border zone between land and sea, the ecosystems of the floodplains are characterized by high integral productivity. This is a valuable spawning and feeding area for fish. One of the main migration routes of migratory birds passes through the floodplains, for which, as well as for wintering birds, they serve as a food source. In many places, especially near river mouths, floodplains are intersected by a large number of branches and eriks [1].

Floodplain areas and especially their coastal areas are favorite recreation areas for the population.

Swampiness on the territory of the coastal strip occurs in the form of separate local areas in depressions of the relief of the river floodplain. Gruzskoy Elanchik and modern sand spits. There are 542 hectares of wetlands in the coastal marine zone.

Landslides, cliffs. Landslide processes are quite frequent phenomena in the Northern Azov region.

The phenomena of coastal cliff landslides are extremely important and interesting.

As a result of wave activity, sandstones and shell limestones appear at the base of the cliff, and the waves carve deep niches into them. The cliff gradually grows,

layers of hard rock rise higher and, finally, clay deposits appear from underneath them. The picture of the coast is gradually changing. The cliff, which can no longer be called a cliff, retreats far from the water's edge, and the strip in front of it, several tens of meters wide, turns into a slope with many hillocks and upturned ledges. Another, now low, cliff has formed near the sea, in front of which a narrow strip of beach still stretches. New elements of the coastal topography also appear in the form of many small outcrops of sandstone and stones scattered in shallow water and extending into the sea.

Abrasion processes are actively manifested in areas where the coastal slope is directly exposed to waves, the beach is narrow or completely absent. In the Donetsk Azov region, 80% of the shores are represented by cliffs and landslide structures [4].

Gullies and beams. The entire described territory is subject to gully erosion, as a result of which the relief everywhere is of a flat gully-gully character.

The gullies extending across the territory of the subregion have a gently concave bottom, often without a pronounced channel; the slopes are convex, smoothly turning into watershed spaces. There are usually no clearly defined peaks; the hollow smoothly turns into a beam. The length of the beams is usually from hundreds of meters to 15-25 kilometers, the depth is from several meters to tens of meters, and the width is up to hundreds of meters. The slopes and bottom are turfed and often covered with bushes, when destroyed, the beams become centers of accelerated erosion; Bottom erosion is also common in gullies. They often develop from ravines, but can also arise without a gully stage. Unlike gullies, the bottom and slopes of ravines are not covered with turf and are subject to erosion. The very high gullyiness of the territory is due to sedimentary rocks that are susceptible to destruction and the nature of the terrain of the territory. Common processes of destruction of the earth's surface under the influence of gravity (landslides) also contribute to the development of ravines. The gully-gully type of relief of the territory is directly related to geographic zoning. Climatic features of the area such as constant wind, aridity, and heavy torrential rains are accompanied by wind and water erosion. As a result, the gullyiness of the territory increases. In the Donetsk Azov region, the development of both young (intensively developing) and mature ravines is observed on elevated plains or hills, as well as on the slopes of gullies. The length of the ravines ranges from several meters to several kilometers. It should also be noted that the number of ravines is increasing as a result of human activity.

Bedrock outcrops. Complex tectonics determines the frequent change of rocks of different hardness on the surface and the widespread development of small structural forms of relief, which are very common on landslide structures, in river valleys, on watersheds and along their slopes. A distinctive feature of the

latter is the absence or low thickness of loose deposits on their surface. The variety of relief is created by exposed bedrock, represented mainly by easily eroded shales, alternating with hard limestones and sandstones. The former are associated with depressions in relief, while the latter create ridges elongated along the strike of the strata.

In the continental part of the territory, island outcrops of crystalline rocks of the Ukrainian shield are also common on the flat steppe surface. Due to their similarity with the mounds of the Azov steppes, such stone ledges have long been called graves.

The second half of the Quaternary period was marked by vigorous erosion processes, which were caused by oscillatory movements of a positive sign. The incision of rivers has increased, watersheds are being developed, the cover of loose sediments is being destroyed, and therefore bedrock is being exposed more actively.

Forest plantations. Forest plantations of artificial origin grow within the Donetsk Azov region. Most of them are forest protection belts of agricultural land. A small proportion of forest areas arose as a result of the implementation of various State programs. These complexes are mainly represented by coniferous trees and are embedded in the landscape of the territory in the form of green wedges. However, it should be noted that the condition of the plants is unsatisfactory. Growing on saline sandy substrates of the coastal zone, they are in a state of extreme degradation. Thus, a Scots pine at the age of 35 years has the appearance of a 7-year-old plant.

Steppe areas border on large expanses of coastal salt marshes. They are rich in flat lands, fertile soils, southern warmth and light. The natural vegetation cover is dominated by herbaceous vegetation.

The nature of steppe areas is usually devoid of external effects and is not always colorful, but surprisingly harmonious. The exception is the period of spring-early summer flowering, when the feather grass sea, the islands of Vorontsov, the "flaming tongues" of wild poppy, the glades of the Schrenck tulip and, amazing in their richness, flowering herbs cover the watersheds and slopes of the ravines. It is picturesquely complemented by reed thickets formed on the banks and shallow areas of the river's steppe watercourses.

The cultural "traces" of our ancestors also belong to the steppe landscapes: complexes of burial mounds, ancient mines, ruined settlements, kulpytasy, clusters of menhirs. Their scientific, educational, ethical, aesthetic role in the landscape of the steppes is very great. But, in addition, they are of great value for the preservation of landscape, soil, and biological diversity and are a serious reason for the museumization of individual areas of the steppe landscape.

Karst. In close proximity to the village of Guselshchikovo, Novoazovsky district, in the Pontian limestones, as a result of leaching of calcareous rocks, the

only karst cave in the Azov region was formed. Its length is 200-300 meters with several branches. The ceiling height is up to 1 meter, in some places 40-50 centimeters with narrow openings. Walkthrough is not available.

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