

MAY 26, 2021

**INTERNATIONAL SCIENTIFIC CONFERENCE
SCIENCE AND INNOVATION 2021:
DEVELOPMENT DIRECTIONS AND
PRIORITIES**



MELBOURNE, AUSTRALIA

International Conference

“Science and innovations 2021:
development directions and priorities”

May 26, 2021

Melbourne, Australia

Proceedings of the International Conference
**“Science and innovations 2021: development
directions and priorities”**
(May 26, 2021. Melbourne, Australia)

ISBN 978-0-6451024-9-9 (AUSPUBLISHERS, online)
ISBN 978-5-905695-15-5 (Infinity publishing, print)

These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examines technical and sociological issues of research issues. Some articles deal with theoretical and methodological approaches and principles of research questions of personality professionalization.

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DOI 10.34660/INF.2021.48.70.001

DIGITALIZATION OF ECONOMY IN RUSSIA: PROSPECTS AND CHALLENGES

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Abstract. *The article deals with the analysis of the digital economy and its impact on the world economy today, the shift to a new quality level of the world digital civilization. The authors put forward new ways of the Russian economy adaption to the new data intellectual era. The society institutional structure is being changed under the influence of broad technological transmissions.*

Although pros and cons of the economy digitalization are vivid, the positive aspects such as trade expansion, production growth, creation of new working places, rigid rivalry, overweigh the negative consequences of the latest developments, e.g. an ever growing increase of unemployment in the sphere of technology which can affect mostly developing countries according to the World Bank forecast. It can also result in large scale competition even among the middle-class employees that inevitably will lead to severe salaries drop.

Keywords: *digital economy, technological transmissions, economy digitalization, world digital civilization.*

Introduction

The term digitalization appeared in the end of the XX century when Nicholas Negroponte, an American information scientist, introduced and disclosed the concept of “digital economy” in 1995.

In a broad sense, the World Bank refers to an economy that is based on digital computing technologies, although we increasingly perceive this as conducting business through markets based on the internet and the World Wide Web. In today’s economy, the digital sector companies come to the fore and become growing points that provide the economy with digital resources. Nowadays the digital

economy sector companies are the largest companies in the world economy. In the beginning of the 20th century companies performing in such fields as engineering, metallurgy, mining, oil were considered the most progressive and modern.

“The digital economy is an economic activity, in which the key factor of production is digital data, the processing of large volumes and the use of the analysis results of which, in comparison with traditional forms of management, can significantly increase the efficiency of various types of production, technologies, equipment, storage, sale, delivery of goods and services”. Thus, the term “digitalization” means the process of transition to the digital economy.

Management in digital economy is also characterized by the role of data and its management methods which are defined as main resources in production, distribution, exchange, and consumption.

Methods

The economic component of digital economy is embedded in its economic efficiency and reflects direct financial involvement of its participants. Budget efficiency of local, regional, or federal levels budget projects is considered to be a financial implication of projects in life. Usually, large projects reflect the national economic efficiency. Such data as economic costs and results beyond the direct financial interests of state management are considered when the efficiency is evaluated. The effectiveness of the digital economy is achieved by scaling down the cost of processing, storage, transmission of data and the development of infrastructure that brings the world to a new stage of the scientific and technical revolution.

There can be distinguished three main interrelated components in the structure of the digital economy. They determine the level of the society development, that is, the fields of activity where the interaction between supplies and consumers takes place, innovative technological platforms that form conditions for the dynamic development of various activity sections; institutional and infrastructural environment providing conditions for technological platforms development plus an effective interaction of the economic agents.

E-commerce, the Internet banking, electronic payments, advertising, an electronic access to public services constitute the main elements of the digital economy. The accessibility and active implication of these areas are determined by the DEI state digitalization index, the digital Evolution Index.

It is worth noting that in 2016 the World Bank prepared a report on the state of the digital economy “Digital Dividends” which showcased the benefits of its development including:

- Increase of labor efficiency.
- Increase of the competitiveness of companies.
- Reduction of production costs.

- Creation of new job sites.
- Better satisfaction of people’s needs.
- Poverty and social inequality reduction.
- The risks of the transition to “digital” for the economies of various countries, in particular:
 - cybersecurity risks,
 - mass unemployment,
 - the growing “digital divide”. The latter means a divide in digital education as an access to digital services and products what can result in a divide in the well-being. It can take place between citizens and businesses within the countries and between the countries.

For the implementation of these processes in 2017 the Strategy for the Development of the Information Society in the Russian Federation for 2017 - 2030 was approved by Decree of President of the Russian Federation dated May 9, 2017 adopted and approved in the Russian Federation Order 1632-r dated July 28, 2017.

The document formulates the definition of the digital economy which, alongside with the economic activity, is perceived as the key factor of production. All data is presented in a digital form contributing to the modern trends to create information space which meets the society demand for reliable information of high quality as it will develop the information technology infrastructure of Russia through creating and masterfully applying its achievements to the formation of a new high-tech basis for its social and economic fields.

The main objective of the “Digital Economy of the Russian federation” Program is to provide a special economic environment which complies with institutional economic needs as it is expressed in a digital form, provides maximum interaction of economic agents. Besides its aim is to reduce restrictions on promotion of high-tech production that can compete on the world market in various sectors of economy.

The state program “Digital Economy” spelled out the development of the cloud “Platform of the Industrial Internet of Things”, the so-called “Industry 4.0”. According to the project, the platform should provide predictive analytics and intelligent equipment maintenance. The system will analyze data coming from sensors in production, predicting possible wear and equipment failures. Equipment failures in enterprises can interrupt the entire production cycle, which entails economic losses. Predictive analytics will help minimize this negative consequence.

Cloud technologies and data centers, that is, data processing centers and data centers, became another drive for the Russian digital economy development. For example, “Rostelecom” has already launched the Unified Biometric System service which banks plan to use and is also developing systems for a smart city.

Following the introduction of the “Yarovaya Package”, foreign dot.com companies must store the data of Russian users on the territory of Russia as it should stimulate the creation and spread of data centers.

At the same time, the cloud B2C sector is not being developed as actively as B2B: if several gigabytes are enough for users to store photos, music, and other data, then the business volumes are calculated in zettabytes. Therefore, many companies have already entered into partnership agreements with cloud vendors. For example, under an agreement between Microsoft and MTS, the operator has begun to provide customers with hybrid cloud services Microsoft Azure Stack from their data centers since 2018. Cloud systems of financial and economic activities are being mostly actively introduced in Russia. According to the Federal Treasury, cloud accounting services based on the state information system “Electronic budget” are expected to bring significant savings to the state and increase work efficiency by 34%. Thus, a unified cloud accounting system is the basis for transition to a “shared service center” – SSC.

One of the sets of data sources helps to track the performance indicators of the May Presidential decrees in such important fields as healthcare, education, demography, ecology, digitalization of the economy. The system allows to group data, quickly generate, and upload reports in a convenient format.

Another important direction for the country’s economy in the field of digitalization is determining the place of Russia on the global digital market. Unfortunately, now Russia occupies only 41st place among the countries in the global digital economy development implementation process. This fact confirms the relevance of the issue under consideration.

Even though individual digitalization cases have already proven their efficiency, Russia is still lagging global trends and is at the very beginning of its path to them. Suffice it to say, that western countries production is already quite highly automated, so the increase in efficiency by 1-2% is not as noticeable as it might be in Russia. The implementation of digital economy tools will increase the efficiency of production and management immediately up to 10%. However, digitalization in this country is being slowed down outdated equipment, budgets, and the human factor as not all enterprises leaders are ready for such a transformation.

Results

Today one of the priority directions of the Russian Strategy for Scientific and Technological Development is digital economy. A full-fledged consistent economy digitalization in Russia will create a platform for a qualitative change in its structure and provide long-term opportunities. Digital platforms based on the interaction of various information systems are successfully developed in Russia. This process opens the door to the use of a unified identification and authentication

system which makes public services in electronic format more accessible to the population. However, it should be stressed that these platforms have not yet been sufficiently developed and as a result they are not fully available in all the country regions.

As it was said above, the economy digitalization has only positive consequences such as expansion of trade, productivity growth, competitiveness rise, creation of new job sites, etc., and there is one significant disadvantage arising from the job sites transformations, that is a threat of the explosive growth of technological unemployment, especially in developing countries, as the World Bank warns.

There is no doubt, the coronavirus pandemic activated digital technologies, but experts note with deep concern that the economy digitalization today is not a blessing but also a serious threat and challenge to national security. It is explained by the fact that the use of information and telecommunication technologies at regional and municipal management levels is being poorly developed since only about 10% of municipalities meet the requirements of the required digitalization levels.

The hidden threat flows out of the fact that today a lot of ministries and departments, state-owned companies and state corporations, enterprises and educational institutions use imported computers and software. According to McKinsey report “Digital Russia. New Reality” (2017) Russia is 80-100 per cent dependent on the IT equipment import in the industrial sector. That is true both for the equipment itself and the software. The absence of Russia in software markets where the leaders are Microsoft, Google and others not only entails risks of the implementation of the “Digital Economy of the Russian federation” program but also creates a direct threat to the national security as foreign developers can easily disable computers if necessary and thus they will paralyze the national economy.

The tightening of legislation in the field of digital technologies, the economic crisis, sanctions, and other political processes also does not stimulate the active transfer of production performance to new digital rails.

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DOI 10.34660/INF.2021.90.45.003

THE IMPACT OF PRODUCTION POTENTIAL USAGE IN AGRICULTURAL FIELD ON ECONOMIC DEVELOPMENT

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Summary. *The article examines the importance of efficient use of production resources in agriculture, which is considered one of the most pressing issues in modern conditions, in economic development. In particular, the impact of the measures envisaged on the socio-economic development of rural areas, the improvement of the economic situation and the identification of ways to make better use of existing opportunities on economic development is analyzed. Indicators of investment and innovation potential of the agricultural sector depend largely on the characteristics of this sector of the economy. Thus, the policy of import substitution by ensuring the efficient use of production potential primarily promotes the satisfaction of domestic demand. So, if export-oriented production implies an increase in commodity production, it also solves the problem of replacing imports with exports. The creation of export-oriented production will stimulate the development of sales markets for these products, make more efficient use of resource, scientific, technical and production potential of the agricultural sector, diversify the production structure, expand opportunities for attracting new investment, increase the potential of various sectors of the agricultural economy.*

Keywords: *economic efficiency, resource, import, export, investment, innovation, development, stimulation.*

The modern stage of development of the national economy requires attention in the implementation of agrarian policy to solve socio-economic problems of a village with the effective use of internal resource potential. This significantly depends on the quality and economic justification of the measures to effectively use the production potential. Studies show that there are significant opportunities in the field of macroeconomic stability in the country, reducing the impact of the crisis occurring at the international level, regulating foreign economic relations, improving the activity of the agrarian economy [2, p. 12]. In this regard, stimulating efficient use of production capacity with the use of regulatory means of

influence in the conditions of limiting the import of high-tech commodities, by increasing the potential to replace imports, its scientific and technical base and etc. within the agricultural development sphere framework has a significant role. In addition, it should be taken into account that the indicators of the investment and innovation potential of the agrarian sphere depend mostly on the characteristics of this important sphere of the economy [5, p. 68]. Therefore, as one of the main directions of stimulation activity, the creation of the necessary conditions for increasing investment activity of agricultural enterprises and the household sector as a whole is among the main issues.

The policy of the state towards the development of the agrarian sphere by stimulating the effective use of production potential mainly consists of the following:

- stimulating the development of re-production processes through normative-legal regulation of investment and other financial relations and measures to improve investment attractiveness;
- providing necessary support to the formation, development and use of the resource potential of its development in the strategic directions of the agrarian sphere;
- ensuring socio-economic development of agriculture in terms of innovation and modernization;
- supporting the development of innovative production of competitive products that can replace the products of analogical import;
- to create conditions for attracting particular investments in agrarian development areas, which are strategically important for the country.

The policy of substitution of imports, which is considered one of the main objectives of the strategy to ensure the efficient use of production potential, first of all makes the fulfilment of domestic demand to stand out. Therefore, if export-oriented production aimed at the demand of the foreign market primarily implies an increase in commodity production, this in turn entails a solution to the problem of replacing imports with exports [4, p. 246].

In practice, the substitution of imports is associated with one of the major tasks of the economics. Diversification of production, as well as specialization and cooperation of agricultural enterprises play an indispensable role in this process. It should be noted that the substitution of imports is one of the prior directions of the modern economy, including the innovative development of the agrarian sphere. This allows not only to pursue an active policy of structural change, but also to reduce product loss through the creation of systems for its storage, packaging, transportation and sale at all stages of production. This means that the policy aimed at replacing imports considers the active range policy, complement and replace common export commodity brands and create more competitive brands as the main objective. According to researches it turns out that, along with other

measures, programs and mechanisms are required for diversification of the agrarian economy.

In particular, it should be noted that the management of the agrarian economy should be based on the fact that the substitution of imports should be considered a resource of economic development. This concept of understanding the process of replacing imports determines the priorities of the new agrarian policy aimed at rational use of resources and modernization of the non-perfect sector and innovative development. Then, it is very important, in principle, to find out the directions of state influence on the efficient use of economic potential, taking into account the characteristics of the specific area within the framework of distinctive production areas.

Despite the fact that in recent years great attention has been paid to ensuring the efficiency of the usage of production potential in the agrarian sector at the level of the state's economic policy, there are still certain shortcomings in this area. Research shows that although the necessary tools and institutions that ensure successful completion and reintegration of relevant programmes serve to accelerate the socio-economic development of the agrarian sphere as a whole and improve the efficiency of the agricultural economy within the framework of this policy, still good resources and opportunities remain unused. This means that, it is necessary to apply additional instruments and institutional tools that can provide favourable conditions for the efficiency of the usage of production potential in the agrarian sector.

The implementation of the strategy to ensure the efficiency of the usage of agricultural production potential should be carried out gradually, starting from the stimulation of commodity production till the implementation of innovative development by increasing the production of scientific and high-tech products [1, p. 24]. The basis of this strategy should be improving the quality of products and technologies used in enterprises, expanding the application of innovations to production.

The innovative direction of the transition to the model of ensuring the efficiency of the use of production resources in the agrarian sector reflects the following measures:

- application of the latest achievements of scientific and technical progress to production, creation and application of innovative products and technologies;
- increase in revenues and value added through the application of innovations in science-intensive production;
- increase the employment and the living standards of population;
- increase the level of commercialization of the results of local scientific research by reducing the specific weight of equipment and technologies purchased from abroad;
- strengthening the country's economic and food security;

- increase the demand for local goods and expansion of production capacities;
- improve trade balance;
- ensuring the flow of local and foreign investments into the agrarian sphere, etc.

International experience shows that it is necessary to ensure the efficiency of the usage of production resources in the agrarian sector, to face the problem of reconstruction of the production structure with proportions that are traditional for the resource-oriented economy. The direct relationship of such a reconstruction with the policy of substitution of commodity imports is evident at the level of the problem of increasing the rate of use of production resources in order to comprehensively increase the added value created during the production of goods in the country.

Research studies have shown that the policy of efficiency of the usage of production resources is closely related to the management of this process. The tasks of managing the use of production resources are significantly associated with the improvement and development of tools and institutions for the management of various economic processes, as well as with the means of stimulating influence on the agribusiness environment. The need for effective management of the use of resources as part of the agrarian policy stems from the point of diversification of the structure of the national economy and the importance of ensuring the country's food security. It should be noted that the measures to ensure efficiency in the use of production resources are aimed not only at meeting the country's demand at the expense of local production, but also become part of the strategy for the replacement of imports by imports.

The purpose of the development and implementation of measures to ensure the efficiency of the use of production resources includes the following: increase the employment and the living standards of the population; development of scientific and technical progress; stimulation of the provision of demand for commodities at the expense of local production, expand the production capacity of agrarian economy, formalization of capacity to ensure access to global markets; ensuring economic and food security of the country and etc [3, p. 16]. From the point of view of this, several alternative directions of the strategy for the development of agricultural production can be noted:

- stimulation of relatively weak production areas. For this purpose, the efforts of the state are aimed at developing the production of products that are not competitive even against the goods of foreign producers in the domestic market;
- making developed areas with sufficient potential for foreign trade operations more active. For this purpose, the state seeks to strengthen the successful exporters in foreign markets;
- implementation of the strategy to replace imports with imports – the state

is trying to produce more goods by its own strength, import is carried out in the absence of analogical local goods;

- creation of non-existent areas – at the initial stage of the existence of newly created segments of production, state support is directed to them when it is necessary to provide price advantages for commodities that replace imported ones;
- allocation of resources in the efficiently operating areas – providing state support to the areas that operate more efficiently and have export potential;
- stimulation of structures that use production resources more efficiently.

Research shows that the approach to more efficient use of production resources is multifaceted, the implementation of measures in this direction mainly in promising, competitive areas allows to achieve more positive results. This directly depends on the extent to which the production structures themselves are provided with production resources.

As practice shows, the policy of efficient usage of resources by production structures becomes possible when the following conditions are fulfilled:

- formation of sufficient demand for goods produced within the country;
- availability of material and technical base of production structures for the organization of production or ability to create and obtain it in order to meet the demand for these resources in a short time;
- stimulation of investments for production diversification along with stimulation of more efficient production areas;
- determination of measures to ensure high level of competitiveness of local commodities;
- innovation directed development of agrarian economy and stimulation of production of high-quality high-tech products as a result;
- formalization of the relevant mechanism on the delivery of goods to consumers;
- state regulation of tariff and non-tariff restrictions for products which are analogues of products produced in enterprises;
- ensuring that the exported and replaced products comply with quality standards and etc.

Depending on if directed to meeting the needs of markets by increasing production with the efficient use of production resources, the following measures are of particular importance:

- develop a strategy to increase the specific weight of the products aimed at meeting the demand in the domestic market among the overall product;
- increase of special weight of products in foreign markets aimed at meeting demand in foreign market;
- to develop a strategy for strengthening the products aimed at meeting the demand in foreign and domestic markets in the domestic and foreign markets of.

It is known that the main objective of increasing the production of agricultural products through the efficient use of production resources is that the goods are produced primarily in order to meet the demand of the domestic market and to ensure export. There is a serious need for manufacturers to take into account the requirements of foreign markets for the quality of the commodity, which can lead to progress in the field of innovation and technology. Under such conditions, production structures are highly interested in international trade, and they try to take into account the global trends in the development of technologies and innovations to produce high-quality products. It seems that the importance of efficient use of production resources in economic development manifests itself in different directions. In this regard, the strategy of gradually replacing imports with export is one of the most optimal options. Meantime, in order to master the international market, it is necessary to independently determine the directions of the development of substitution of imports, based on the volume of resources available, and at the same time, the development of production areas aimed at the domestic market, which require less costs, is set as the main goal.

The specific characteristic of the mixed type of noted strategy is that it is possible to rationally distribute the amount of resources needed to expand the volume of export by the implementation of the import substitution in the domestic and foreign markets. For this purpose, the product created in production should naturally be aimed at both domestic and foreign markets. In this case, it is imperative to achieve an acceptable level of competitiveness of the domestic product, since producers should be more interested in improving the competitiveness of the commodity they produce by developing innovations to prevent the restriction of competition by the importer [6, p.127]. Otherwise, production enterprises may become completely dependent on the subsidies provided by the state. Meanwhile, it is necessary to focus not on the imitation of production technologies, but on the creation of its own specific production.

At the level of agrarian sphere in economic literature, there are three main directions of import substitution policy as a priority of economic development. In the first direction, the agro-industrial sphere of the country begins to produce its own products in the maximum amount. Import is intended only for commodities that do not have analogues or have a high level of value.

In the second direction, the state's support is directed to new segments of the market, in which the production enterprises entering these markets need measures to ensure competitive advantages at the initial stage. Subsequently, the support made to them decreases and finally completely ceases.

The main purpose of the state policy in the third direction consists of measures that implement active export activities of enterprises and include the support for competitive areas.

Research shows that the main conditions for the efficient use of production resources in the agrarian sphere should first of all be formed at the level of distinctive production areas. The mechanism of efficient use of production resources at the level of production sites allows us to quickly determine the promising directions of concentration of natural, financial, innovation, data resources in order to organize product production. At this time, the state plays an important role in the implementation of this policy. Government agencies are able to create favorable conditions and appropriate infrastructure for the cooperation of enterprises in order to use the available resources efficiently. In essence, making demand more active through state orders, investments and subsidies, meeting demand with the financing of infrastructure facilities on the terms of public-private partnership, creation of agro-parks and clusters, etc. methods is based on a model that is in itself based on the stimulation of production enterprises. It means that, state plays an important role during the organization of measures for efficient use of production resources with its coordinating role. Research shows that the following can be applied to the implementation of the policy of more efficient use of resources, scientific-technical and production potential of the agrarian sphere:

- 1) legal guarantee based on the availability of necessary legislative and normative-legal documents;
- 2) Organization-information support – development and organization of information support, creation of management structures of various processes at the level of production areas;
- 3) financial support – for development and implementation of targeted programs, subsidies, grants, rewards, etc.

In order to achieve the efficiency of realization the use of production resources in order to ensure the innovative development of the agrarian economy, the following measures can be considered expedient:

- to use measures to support the achievement of investment activity in agriculture and development of investment attractiveness;
- to use of the policy of diversification of production that directed to the policy which is in accordance with modern institutional macroeconomic conditions;
- to improve the agribusiness environment, support the process of formation of separate areas and more developed structure of the agrarian economy as a whole;
- formation of appropriate institutional environment in the development of competitiveness of agricultural enterprises.

The application of these measures to production can significantly affect the provision of economic security and innovative development within the framework of the transforming strategy of economic development, as well as the efficiency and profitability of the activities of agricultural enterprises, allowing for stable economic growth. At this time it should be taken into account that one of the most

important conditions for achieving the effectiveness of innovative changes in the agrarian sector of the economy is ensuring the coordination of the sphere's managerial impact with the state's economic policy measures. For this purpose, in practice, direct and indirect methods of regulation used by the state are distinguished.

Direct methods of regulation perform functions of prohibitive, restrictive and regulative, by reflecting in itself mainly issues related to legislation. Indirect methods of regulation are usually characterized as economic methods. The state often uses indirect means of influence while regulating economic processes, including tariff and non-tariff regulations. The method of tariff regulation consists of the increase of customs tariffs, import taxes and fees for commodities.

In economic literature, non-tariff regulation is also divided into direct and indirect means. The means of direct influence are direct prohibitions and quotas. Indirect methods of non-tariff regulation oblige importers to make decisions taking into account the conditions of activity which are specially created in the territory of the country. These are, in fact, economic measures.

Customs duties on a number of types of goods are used in practice in order to stimulate local production. At the same time, it is possible to consider the reduction of customs duties on the import of different types of raw material as a measure of assistance to the export. This can also play a stimulating role in bringing local goods to the world market by serving to stimulate export-oriented production of local producers.

One of the most important areas of achieving efficiency in the use of production resources in order to ensure the development of the agrarian economy is the stimulating support of import substitution programs and projects, including export support programs. However, it should be noted that the development of entrepreneurship and its economic support are not always directly related to import substitution policy, but can also be used in the process of creating and using targeted programs.

Indirect methods of regulation during the implementation of regulatory policy can also participate in economic processes as an administrative method: currency control, licensing, standardization and certification, identification of specific regulations, etc.

Stimulation of the achievement of the efficiency of the production resources usage in the agrarian sphere requires significant investments. Here, the state should act as a guarantor in accordance with the principles of economic security, including food security and stimulate local production. For this purpose, allocation of funds for incentive measures takes place in the form of co-financing of subsidies and production-oriented research, as well as the provision of grants for public procurement. Subsidies from the state budget can also be provided to enterprises implementing complex projects on priority areas of agriculture. Ideally, such a measure of reducing the cost of borrowed funds for manufacturing enterprises is

taken to avoid problems. Within the framework of this mechanism, enterprises are subsidized to pay interest on loans, which is considered an important support measure made by the state.

A significant place is allocated to state subsidies, including research work, technical reconstruction and modernization in various sectors of the economy [2, p. 7]. They can be given to the development of infrastructure and modernization of production, subsidizing interest rates on loans, subsidizing the application of innovations in the framework of investment projects when achieving a certain level of agricultural production. It should be noted that within the framework of financing projects aimed at stimulating production, the necessary measures to support investment programs are identified and adopted. The main objective of such measures is to increase the volume of long-term and soft loans of agricultural enterprises.

Within the framework of the programs, only projects to be implemented in certain areas selected as a result of the competition are financed. One of the similar financial support measures is debt funds provided to help enterprises with competitive and export oriented production at the expense of the state budget. For this purpose, special funds are created and financing of projects before production is included in their duties. Such funds are an important element of the system of state measures aimed at increasing the competitiveness of the agrarian economy globally and implementing the policy of support to the export. These funds should be viewed as a unit that combines individual measures and instruments used to support production, since they provide real interaction between the enterprises and the state by allowing them to take preventive actions. It can be noted that these funds play a serious role in stimulating production and become the main actual tool for the efficiency of the resource usage process.

In addition, special investment contracts are used in international practice. This agreement guarantees that the investor can invest in the production process in better conditions for several years. The investor undertakes to carry out production of the specified size. If the credit is accessible for enterprises, the incentive policy is systematic, the measures to regulate money and credit, to prevent the growth of tariffs and credit rates are associated with them, these measures ensure a long-term positive effect. The interaction of producers with the state in this form can naturally lead to great success in the implementation of projects.

The main principle in private investment contracts is non-financial mechanism and motivates participation in the creation of new production areas, production diversification and development of the production potential of the agrarian sphere as a whole. Its main features are the stabilization of the current conditions for the investor, who accepts the obligations for the organization and modernization of production.

Unlike the cooperation between the state and enterprises, special investment

contracts do not involve the transfer of real estate from state bodies directly to investors. Thus, these contracts are one step ahead in contrast to the forms of cooperation of the state with various enterprises. Private investment contracts also play an important role in facilitating administration and do not offer concessions not specified in the legislation. This allows to reduce the long duration of the investment phase of the project.

Another important point for the participants of special investment contracts is that the product produced within this project is considered a local product. A number of normative documents limit the import of some imported products. In a number of areas, it is possible to demonstrate the substitution of individual elements and the standardization that satisfies environmental requirements, such as measures that contribute to export. This in turn makes it possible to reduce imports of poor quality products, becoming one of the main factors that stimulates local producers to produce competitive products.

Studies have shown that appropriate measures are not only a tool for improving the quality and competitiveness of the product, but also for ensuring production efficiency at all levels of management. This, in turn, can manifest itself in processes as a guarantor of the use of resources in agricultural production. Therefore, one of the objectives of the measures aimed at efficient use of production resources should be taking into account interstate standards that ensure the creation and development of priority production areas and take into account the most advanced international experience.

Notes above show that in order to achieve the efficiency of the use of production resources in the agrarian sphere, it is important to take into account the resource capabilities of the certain production area and the development characteristics of each sector of the economy of that area. This is one of the main conditions for the development of various sectors of the agrarian economy as a whole, and it manifests itself as a powerful tool of internal and external demand for the product produced.

Thus, the development of the agrarian sector and the growth of production are possible on account of the more efficient use of internal resources. In order to effectively implement this policy, creating demand with purchasing power and ensuring the continuity of the issue of adequate financing of agricultural enterprises and expanding the stimulation measures as a whole should be one of the most important priorities of the state.

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USING THE PRINCIPLES OF MULTICULTURAL EDUCATION IN THE MODERN EDUCATIONAL PROCESS

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Abstract. *The article analyzes international approaches to the use of the principles of multicultural education in the modern educational process. Various approaches within the framework of multicultural education are highlighted, its purpose and basic principles are formulated. The concept of a teacher's multicultural competence and its main components are defined. Methods and techniques of pedagogical activity that can be used in solving the problems of forming a multicultural environment have been determined.*

Keywords: *multicultural education, multicultural competence, acculturation approach, dialogue approach, cultural pluralism, the concept of multiperspective education, the formation of a multicultural environment.*

Multicultural education took shape as a separate area of pedagogical theory and practice in the last quarter of the 20th century. It arose and is developing against the background of sharply aggravated global social, economic, ethnic, spiritual and moral problems. Among them are economic and social inequality, conflicts on national and religious grounds, decline in moral values, etc.

An important factor in the development of multicultural education is the intensive development of integration processes in the modern world, the desire of many countries to integrate into the world and European socio-cultural and educational space, while preserving their national identity. With the opening of borders between states, people's mobility increases, their motivation to learn foreign languages, as well as to establish and maintain contacts within their own country and abroad.

At the initiative of UNESCO 2001-2010 were declared the International Decade for a Culture of Peace and Non-Violence for the Children of the World. Thanks to the activities of UNESCO, in the modern world community, attention has significantly increased to the preservation of national and cultural traditions of the peoples of different countries and their development in the context of multicultural education.

Multicultural education has great educational potential, developing in students such qualities as patriotism, tolerance, interest in the cultures of the peoples of their country and other countries of the world, the culture of interethnic communication. Such education can also activate the creative potential of an individual, create pedagogical conditions for the participation of schoolchildren in various forms of activity for the study, preservation and creative development of the traditions of various ethnic cultures.

Several approaches are distinguished in the study of the problem of multicultural education in world pedagogy. Within the framework of the acculturation approach, most foreign studies are of the opinion that multicultural education is designed to provide assistance and support to representatives of both contacting cultures, fostering such qualities as mutual openness, interest and tolerance [10].

For Russia, it is more relevant to preserve and enrich both the Russian culture, which is the dominant one in our country, and the national and cultural identity of other peoples inhabiting Russia, the so-called dialogue approach based on the ideas of openness, dialogue of cultures, and cultural pluralism. The essence of this approach is to consider multicultural education as a way to familiarize students with different cultures in order to form an international consciousness that allows them to integrate into the world and European cultural and educational space [3].

The goal of the participants in the dialogue is to achieve mutual understanding with all the possible difference in the positions taken in this dialogue. The peculiarity of the dialogue of multilingual cultures is that the multifunctionality of the words of one language is exaggerated by the variety of options for giving meaning to this word in another language. Each participant in the dialogue, in the process of searching for meaning and its verbalization, comes to his own truth. It may or may not coincide with the truth revealed by another participant. It is important to resolve the issue of the fundamental possibility of their unification [1].

The concept of multiperspective education can also be attributed to the dialogue approach. Its author, H. Gepfert, considers it necessary to revise educational programs to overcome a monocultural orientation, notes that the multiculturalism of an educational program cannot be judged only by the degree of representation of foreign cultures in it. More important is how intensively the idea of a dialogue of cultures is being implemented in the content of education. At the same time, H. Gepfert says that it is necessary to show representatives of other cultures in their life situation, together with their lifestyle, traditions, characteristics and life circumstances [12].

An interesting study that considers multicultural education as social education and training is the work of the German teacher R. Schmitt. His educational program for elementary school, which has the motto "Tolerance, Interaction, Solidarity", is based on the results of a psychological study of the processes of chang-

ing attitudes towards the world and worldview in children. R. Schmitt is one of the few authors touching upon the psychological prerequisites of multicultural education. He actively advocates the use of a problematic role-playing game as a method of multicultural education, during which a discrepancy between conscious and cognitively accepted knowledge and emotional spontaneous reactions is manifested. R. Schmitt formulates two important principles of multicultural education:

- the principle of avoiding normative differences. It is necessary to be very careful with the otherness and alienation of another culture and its representatives;
- the principle of "social closeness". It is advisable to include in the discussion actual, real problems and situations, so that it would be easier to relate them to their own experience [5].

Thus, most international studies agree that the goal of multicultural education is to form an individual who is ready for active creative activity in a modern multicultural and multinational environment, preserving his socio-cultural identity, striving to understand other cultures, respecting other cultural and ethnic communities, who knows how to live in peace and harmony with representatives of different nationalities, races, beliefs.

Today, the state policy of most European countries is based on the concept of multicultural education [2].

The basic document defining the main international approaches in the field of multicultural education was the UNESCO document “Mexico City Declaration on Cultural Policy”. It is important to note from its main provisions that “The international community considers it its duty to preserve and protect the cultural heritage of every nation. All this requires a cultural policy that would protect, develop and enrich the identity and cultural heritage of every nation, ensure full respect for cultural minorities and other cultures of the world”[4].

The practice of multicultural education in the United States is based on the concept of J. Banks on the gradual integration of multicultural material into the content of education. Followers of this concept pay attention to the teacher's ability to explain to students the key concepts of a particular discipline, having previously selected the appropriate examples from a variety of material of ethnic content; the ability to assist the student in understanding the influence of stereotypes within a particular discipline on the process of building knowledge of this discipline; fostering tolerance for racial, ethnic and cultural differences; the ability to combine ethnopsychological and individual characteristics of students (temperament, character, abilities, motives and interests) [9].

The following provisions formulated in the concepts of American specialists in multicultural education represent a positive potential for domestic pedagogy: it is important to consider a student not only as a representative of a certain ethnic group, but also as a person with a set of cultural characteristics (gender and age,

linguistic, ethnic, social, intellectual, physical); the use in the educational process of technologies to involve students in socially transformative activities contributes to the formation of their civic identity, respect for other cultures and their carriers; cooperation of scientists and teachers in teaching and methodological support of the educational process can significantly reduce the gap in the theory and practice of multicultural education [6].

Despite the differences in approaches and peculiarities of understanding the tasks of multicultural education, their solution for any country depends on the multicultural competence of a teacher who is ready to work in a multicultural educational institution. Taking into account the experience of the United States in this area, the main components of such competence can be distinguished, namely:

- knowledge of the culture of their people;
- the ability to help students define their cultural identity; knowledge of ethno-psychological characteristics and individual cultural styles of students;
- taking into account the differences between students in terms of comparison, and not the superiority of some over others;
- the ability to use the cultural characteristics of students as their advantages, not disadvantages; the ability to create and maintain a tolerant atmosphere in the children's team [7].

The leading methods that can be used in solving the problems of forming a system of knowledge and practical experience in a multicultural environment are verbal methods (explanation, heuristic conversation, discussion, lecture); methods of working with text (interpretation, reviewing); practical methods (modeling, design, exercise, training); reflexive methods (analysis, problematization, de-problematization) [11].

A significant role is played by dialogue as a method that presupposes an active position of its participants, primarily students, a method by which the teacher demonstrates model behavior that presupposes respect for the participants in the dialogue, attention to their opinion, and the desire to find a compromise [8].

The reflexive abilities of students are of particular importance, suggesting:

- the ability to analyze the socio-cultural situation and the activities carried out in it;
- the ability to fix personal difficulties in activities and identify problems of personal development;
- the ability to determine the ways out of difficulties and overcoming problems with the help of existing social experience and the development of new technologies of activity.

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DOI 10.34660/INF.2021.56.30.005

**OPTIMIZATION OF THE PROCESS OF IMPROVING THE QUALITY
OF EXECUTION OF DYNAMIC ELEMENTS WITH TURNS WITH
A HOOP FOR FEMALE ATHLETES OF 11-12 YEARS OLD IN
RHYTHMIC GYMNASTICS**

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Abstract. *In the article, on the basis of a system analysis of the components of the technical skill of female athletes, which determine the orientation of mastering and high-quality execution of dynamic elements with rotation in rhythmic gymnastics, a technique for improving the throwing elements with a hoop, based on the development of speed, has been developed and tested, contributing to the optimization of the training process.*

Keywords: *rhythmic gymnastics, dynamic elements with rotation, throwing elements with a hoop, expert judgment, speed, performance technique.*

Introduction

Rhythmic gymnastics as a sport is distinguished by the high importance of the accuracy of motor actions fulfillment when assessing the technical components of the athletes' competitive programs. The least reliable of the wide variety of technical elements with objects, according to experts, are throwing actions [2,4]. In this regard, close attention is paid to the issue of studying the technique of throwing actions in rhythmic gymnastics. The biomechanics of gymnastic exercises mainly requires a high level of special motor training from female athletes. It is the high indices of vestibular stability and quickness of reaction to a moving object when

performing complex dynamic elements with rotation ("risks" R - according to the FIG code), the basis of which are throwing actions are the earnest of the success of competitive activity in this kind of sport. The complexity and responsibility for the error-free execution of complex coordination elements from the rhythmic gymnastics program, in particular dynamic elements with rotation, requires the improvement of the existing teaching methodology. In most of the works devoted to this problem, the authors stop at a qualitative description of the technique of movements from the standpoint of the methodological substantiation of the process of teaching throwing actions [1,3,5]. Meanwhile, as studies show, in rhythmic gymnastics there are no modern scientific and methodological developments on this issue, despite the fact that dynamic elements with rotation make up 30% of the total number of elements in the competitive compositions of athletes.

In this regard, the relevance of the research performed is determined by the importance of high-quality and reliable performance of dynamic elements with rotation in rhythmic gymnastics in the conditions of progressive requirements for the performance skills of female athletes, as well as the need to use scientifically based approaches to the formation of basic skills in throwing actions with a hoop, ensuring the implementation of promising a prognostic approach in the development of elements of a given structural group.

Purpose of the study – to scientifically substantiate and develop a set of means aimed at improving the quality of dynamic elements with rotation, based on the development of indicators of speed in gymnasts of 11-12 years old in an exercise with a hoop in rhythmic gymnastics.

Materials and methods

In order to concretize the direction of pedagogical influences in the development of dynamic elements with rotation (throwing elements - "risks") in rhythmic gymnastics, studies were carried out, including: pedagogical observation, pedagogical testing, expert assessment, design, pedagogical experiment and mathematical and statistical processing of results.










Results and discussion

In the process of analyzing the competitive programs of 3 Olympic cycles from 2009-2012, 2013-2016 and from 2017-2021, quantitative and qualitative indicators were determined for dynamic elements with rotation in competitive compositions with a hoop (table 1, 2).

It was found that the most frequently used types of throw when performing dynamic elements with rotation at the 2012 Olympic Games were a throw in an inclined plane, a throw with a hoop rotating around its axis, as well as throws without visual control and without the help of hands (Table 1). The gymnasts did not use the underfoot/feet throw and the throw from the floor position. This is due to the fact that these variations of the throw are the most difficult to execute.

Analysis of the 2016 Olympics in Rio de Janeiro showed that most often gymnasts performed throws in an inclined plane, during rotation and equally throws without visual control and without the help of hands, while a throw from a position on the floor was also not has been applied.

Table 1 - Dynamics of quantitative indicators of the criteria for the work of the hoop when throwing on dynamic elements with rotation in rhythmic gymnastics in the process of the evolution of the sport (number, n = 24)

Criteria for the work of the hoop when throwing	Olympic cycle		
	2009-2012	2013-2016	2017-2021
	M±m	M±m	M±m
 (without visual control)	0.50±0.12	0.88±0.09	1.25±0.11
 (hands free)	0.50±0.11	0.88±0.09	1.20±0.01
 (under a foot/feet)	0.00±0.00	0.04±0.02	0.21±0.08
 (throw after bouncing off the floor/throw after rolling on the floor)	0.13±0.05	0.17±0.06	0.21±0.07
 (from a position on the floor)	0.00±0.00	0.00±0.00	0.04±0.02
BD (body difficulty)	0.17±0.06	0.08±0.03	0.50±0.11
 (during rotation)	0.33±0.09	0.88±0.11	1.41±0.15
 (passage through the object)	0.04±0.02	0.08±0.03	0.04±0.02
 (incline throw)	1.58±0.19	1.13±0.09	1.38±0.17
 (spinning throw)	0.63±0.13	0.42±0.11	1.00±0.03
Throw after rotating the hoop on a part of the body	0.21±0.07	0.29±0.09	0.33±0.01









At the 2019 World Championships in Baku, the girls demonstrated the maximum possible number of throw varieties, as this was facilitated by the introduction of an open assessment in 2018. The most common among them were: throw during rotation, throw in an inclined plane, throw without visual control, throw without the help of hands, and gymnasts often combined these modifications of throws.

Over the course of 3 Olympic cycles, the number of throw criteria performed during dynamic elements with rotation has steadily increased. At the London Olympics, their total number was 82, in Rio de Janeiro - 116, and at the 2019 World Championships - 182. Thus, over 7 years, their number has grown by 2.2

times, which reflects a significant increase in the technical readiness of female gymnasts.

Analysis of the criteria for catching a hoop when performing dynamic elements with rotation at the London Olympic Games indicates that gymnasts mainly used catching during rotation, without using hands, in a position on the floor, direct repeated throw/bounce from different parts of the body or the floor, as well as catching without visual control (table 2). The girls did not catch under the foot/feet, and the roll catch was demonstrated only 3 times. At the 2016 Olympics, the most common criteria were: catching while spinning, in a position on the floor, without using the hands, without visual control. Catching with body difficulty (BD), as well as catching with direct re-throw/rebound from different parts of the body or the floor were not used. The 2019 World Championship in Baku was characterized by numerous criteria for catching in different performances.

Table 2 - Dynamics of quantitative indicators of the criteria for the work of the hoop when catching on a dynamic element with rotation in rhythmic gymnastics in the process of the evolution of the sport (number, n = 24)

Criteria for the work of the hoop when throwing	Olympic cycle		
	2009-2012	2013-2016	2017-2021
	M±m	M±m	M±m
 (without visual control)	1.54±0.17	0.88±0.15	3.29±0.15
 (hands free)	2.00±0.16	0.92±0.13	2.83±0.22
 (during rotation)	2.08±0.17	1.92±0.14	2.96±0.17
 (on the floor)	1.83±0.13	1.13±0.11	1.42±0.14
 (under a foot/feet)	0.00±0.00	0.04±0.02	0.13±0.05
 (direct re-throw/rebound from different parts of the body or the floor)	0.17±0.06	0.00±0.00	0.08±0.03
BD (body difficulty)	0.38±0.10	0.00±0.00	0.04±0.02
 (passage through the object)	0.42±0.11	0.33±0.01	0.83±0.11
 (roll catching)	0.13±0.05	0.08±0.03	0.25±0.08

So, catching was often demonstrated without visual control, during rotation, without using the hands, in a position on the floor, and in a passage through an object. More popular among gymnasts were catching in rotation, roll, under the leg/legs, direct repeated throw / rebound from different parts of the body or the floor,











as well as catching, performed on body difficulties. Consequently, the 2019 World Championships demonstrated all possible variations of the catching criteria of an apparatus during a dynamic element with rotation.










The catching criteria and their combinations, performed at the World Championships in Baku, are superior in quantitative ratio to the two previous cycles: 292 to 212 and 133 respectively, which is directly related to the competition rules of the 2017-2021 Olympic cycle and the corresponding technical skill of female athletes. Based on the analysis, it follows that at the present stage of development of rhythmic gymnastics there is a tendency to an increase in the level of technical skill of female athletes.

Taking into account that dynamic elements with rotation are rather complex movements in terms of biomechanical structure, increased requirements are imposed on gymnasts for physical fitness, in particular, for speed, ensuring the quality of their performance, in particular catching of the apparatus. In this regard, optimization of special physical training is one of the ways to improve the quality of throwing elements, for further complicating the work of the apparatus when performing dynamic elements. This was confirmed by the data of the performed correlation analysis (table 3, 4).

So, for example, in the course of the correlation analysis of the execution of a hoop with a foot on a forward coup while rolling the hoop on the floor at the moment of returning the hoop with a reverse cut, a relationship was revealed between the quality of its execution and the speed of reaction to a moving hoop ($r = -0.6$) (table 3). Accordingly, if an athlete performs an untimely leg swing to perform a forward flip throw, inaccurately brings her leg under the hoop - sooner or later after it returns, there is a possibility that the throw will not be executed due to the loss of the hoop.

Table 3 - Relationship between the quality of the hoop throw during the basic dynamic element with the rotation "hoop throw -2 rotations around its axis with over-catching the hoop" and speed indicators (n=12)

Control exercises	The technique of throwing during a dynamic element with rotation - 2 rotations around its axis										
	Throw criteria										
										BD	
Estimating the speed of a single movement											
Somersault forward	0.44	-0.09	0.05	0.08	0.36	0.05	-0.01	0.48	-0.03	-0.05	-0.32
Flip to the side	0.16	0.19	-0.21	0.45	-0.52	0.32	-0.01	0.09	0.23	0.68	0.29
"Compass"	0.05	0.10	0.17	0.44	-0.33	0.49	0.18	0.41	0.33	0.35	0.64











Flip forward	0.06	0.14	-0.26	0.43	-0.46	0.44	-0.05	0.48	0.37	0.41	-0.06
Flip back	0.09	0.23	0.14	-0.20	0.15	0.35	0.04	0.26	0.15	0.24	0.11
Motion frequency estimation											
Forward bends	0.04	0.04	-0.10	0.22	0.27	0.25	0.06	0.54	0.08	0.11	-0.36
Support crouch-emphasis lying	0.12	-0.06	0.35	0.23	0.33	0.21	0.03	-0.09	-0.20	-0.06	-0.32
Jumping with change of legs	0.20	-0.13	0.02	-0.58	0.45	-0.28	0.04	-0.38	-0.42	-0.22	-0.35
Raising legs to the side	0.19	0.03	0.11	0.19	0.33	-0.04	-0.25	0.21	0.05	-0.01	0.09
Jumping over a double-folded rope	-0.08	0.00	-0.26	0.42	-0.34	0.19	0.21	0.02	0.32	0.22	0
Evaluation of the speed of reaction											
"Touching the balls"	-0.26	0.01	-0.16	-0.21	-0.56	-0.24	-0.19	0.20	0.33	0.14	0.15
<p>Note: Σ (Changing the axis of rotation of the body/changing the level during rotation: 2 rotations around its axis - vertical roll);  (hoop throw under the shoulder);  (backward swing of the hoop);  (hoop throw);  (throwing the hoop with a foot on a forward roll at the moment of returning the hoop with a reverse cut);  (Throw with a pass into the hoop on a jump with a backward rotation of the hoop);  (throw of the hoop in an inclined plane);  (throw with the rotation of the hoop around its axis);  (kneeling hoop); BD (throw of the hoop on a jump "tap and turn");  (Throw of the hoop with a leg on a coup forward with rotation of the hoop around its axis)</p>											

Secondly, the execution of this throw depends on the speed of the single movement ($r = -0.6$; $r = -0.5$). Thus, the slower the gymnast performs the pre-acrobatic element during the execution of the kick, the less time she will have to return to the starting position at the end of her execution for catching, which will lead to deductions from 0.5 to 1.0 points by the judges E3-E6 (a team of judges evaluating technical errors in execution) according to the rules of the sport. Thirdly, performing a dynamic element with rotation by throwing the hoop with a foot on a forward

roll when rolling the hoop on the floor at the moment of returning the hoop with a reverse cut, it is necessary to take into account the frequency of movement ($r = 0.5$). If the gymnast performs rotational elements under the throw slowly, this can lead to errors in the base of the dynamic element with rotation - the absence of at least two rotations, as well as to technically incorrect catching or its absence.

In the course of establishing the relationship between the expert assessment of the execution of a dynamic element with rotation (throw of the hoop - 2 rotations around its axis - catching the hoop), complicated by various criteria of difficulty in catching, and indicators of speed, it was revealed that the most difficult performance for gymnasts is catching under the foot in a forward flip ($r=0.7$). Secondly, the execution of catching under the foot in a forward roll depends on the rate of movement ($r=0.6$, $r=0.5$). Thus, the faster a gymnast performs rotational elements before catching, the more time she has to coordinate her actions and perform complex catching under the leg in a forward roll, respectively, this type of catching directly depends on the level of development of the athlete's movement frequency. Third, there is a relationship between reaction speed and catching underfoot in a forward roll ($r=0.5$). Accordingly, the lower the level of development of the speed of reaction in the gymnast, the greater the likelihood of an untimely performed rotational element when catching the hoop. Therefore, there is a possibility of an error and an unfulfilled catching due to the early landing of the hoop or an early attempt to perform a forward roll (table 4).

Table 4 - Relationship between the quality of the hoop catching performance during the basic dynamic element with the rotation "throw of the hoop -2 rotations around its axis with overstepping-catching the hoop" and speed indicators (n=12)

Control exercises	Technique of catching during a dynamic element with rotation - 2 rotations around its axis										
	Throw criteria										
								BD			
Estimating the speed of a single movement											
Somersault forward	0.38	0.06	0.22	-0.44	0.68	-0.19	0.45	-0.32	-0.16	-0.30	-0.27
Flip to the side	0.23	-0.01	-0.14	0.18	0.17	-0.01	0.07	0.12	0.06	-0.24	-0.22
"Compass"	0.08	0.09	-0.44	-0.25	0.13	0.31	-0.14	0.17	-0.08	-0.18	0.29
Flip forward	0.18	-0.18	-0.05	-0.35	0.23	0.01	0.31	0.01	0.10	0.03	-0.35
Flip back	-0.07	-0.05	0.18	0.03	0.14	0.26	0.22	0.21	0.4	0.18	0.13

Motion frequency estimation											
Forward bends	0.10	0.16	0.46	-0.19	0.62	-0.16	0.30	-0.03	0.463	0.36	-0.03
Support crouch-emphasis lying	0.09	0.56	0.36	0.25	0.51	-0.11	-0.04	0.10	0.20	0.12	0.28
Jumping with change of legs	-0.01	0.18	0.72	0.49	-0.03	-0.35	0.13	0.20	0.51	0.47	-0.01
Swing your leg forward into a split	0.19	0.40	0.19	0.03	-0.21	0.17	0.09	0.28	-0.15	0.32	0.31
Swing your leg back into a split	0.12	-0.12	0.09	0.01	-0.04	-0.14	-0.12	0.43	0.25	0.37	0.00
Evaluation of the speed of reaction											
"Touching the balls"	-0.28	-0.02	0.37	0.20	-0.50	0.09	0.62	-0.09	-0.05	0.30	-0.24
<p>Notes: Σ (Changing the axis of rotation of the body/changing the level during rotation: 2 rotations around its axis - forward somersault); \otimes (catching with hands passing into the hoop behind the head (right arm up, left arm back)); \neq (catching hoop sitting in knees); \downarrow (catching the hoop with one hand in a back flip); \diagup (catching the hoop under the leg in a forward flip with one hand); \vee (catching in bounce); \equiv (catching the hoop while sitting with one hand); BD (catching the hoop on the balance "attitude"); \ominus (catching in the passage through the hoop on a jump with legs bent); \downarrow (catching the hoop in a roll on the arms and back, arms to the sides); \odot (catching the hoop in a spin on the shin).</p>											

The established connections were taken into account when specifying the means and developing complexes of throwing elements with a hoop, aimed at improving the quality of the execution of dynamic elements based on the development of speed.

Their approbation was carried out in the process of a pedagogical experiment, during three months of a general preparatory mesocycle (from February to April 2021) on the basis of SKHG "Phoenix", St. Petersburg.

16 female athletes aged 11-12 years old took part in the formative experiment. The gymnasts were divided into a control and an experimental group of 8 people. In the control group, training was carried out as usual, in the experimental group, developed complexes of means were used, aimed at improving the quality of the performance

of dynamic elements with a hoop through the development of speed. The exercise complexes were used 3 times a week in the main part of the lesson for 20-30 minutes.

The developed complexes of means were grouped into 6 complexes for throwing a hoop and 7 complexes for catching a hoop, in accordance with the criteria being met: complex № 1, aimed at improving the quality of fulfillment of the throw criterion "after rolling on the floor"; complex № 2, aimed at improving the quality of the fulfillment of the throw criterion "with the rotation of the hoop around its axis"; complex № 3, aimed at improving the quality of fulfillment of the "under-foot" throw criterion; complex № 4, aimed at improving the quality of the implementation of the complexity factor of the throw "on the jump"; complex № 5, aimed at improving the quality of the implementation of the factor of the complexity of the throw "during rotation"; complex № 6, aimed at improving the quality of the fulfillment of the throw criterion "pass through the hoop"; complex № 7, aimed at improving the quality of the catching criterion "under the foot"; complex № 8, aimed at improving the quality of the catching criterion "without the help of hands"; complex № 9, aimed at improving the quality of the catching complexity factor "on the floor"; complex № 10, aimed at improving the quality of the catching criterion "passing through the hoop"; complex № 11, aimed at improving the quality of the catching criterion "out of visual control"; complex № 12, aimed at improving the quality of the catching criterion "during rotation"; complex № 13, aimed at improving the quality of the catching criterion "with rolling the hoop over the body."

In both groups, there was a positive trend, but in the experimental group it was significantly higher. So, at the beginning of the pedagogical experiment, when performing dynamic elements by the subjects of both groups ($p > 0.05$), average and gross errors were made (when throwing - an inaccurate trajectory, an incorrect plane, when catching - steps to the hoop, loss of an object) (Table 5). At the beginning of the experiment, the average score for the technique of performing dynamic elements with rotation with a hoop in competitive compositions among the gymnasts of the control and experimental groups was practically the same: 0.34 ± 0.02 points in the control group and 0.34 ± 0.03 points in the experimental group. with an average penalty of 0.76 ± 0.12 points in the control and 0.78 ± 0.16 points in the experimental groups. Then at the end - in the experimental group, only some gymnasts made mistakes when performing throwing elements in competitive compositions.

After the pedagogical experiment, according to the results of the average score for the technique of performing dynamic elements with rotation in competitive compositions with a hoop, the gymnasts of the experimental group (EG) surpassed the gymnasts of the control group (CG) by 0.18 points (score CG 0.34 ± 0.02 points, EG 0.52 ± 0.02 points) with a decrease in the average penalty by 0.53 points (score CG 0.61 ± 0.12 points, EG 0.08 ± 0.02 points). The pedagogical experiment showed that the developed complexes of means aimed at improving the quality of the fulfill-

ment of dynamic elements with rotation in competitive compositions with a hoop by gymnasts of 11-12 years old in rhythmic gymnastics turned out to be effective.

Table 5 - *The results of an expert assessment of the implementation of dynamic elements with rotation (R) with a hoop in the process of a pedagogical experiment (n=16, points)*

Criteria	At the beginning of the experiment; M±m			At the end of the experiment; M±m		
	EG	CG	P	EG	CG	P
R value	0,34±0,03	0,34±0,02	>0,05	0,52±0,02	0,34±0,02	<0,05
Penalty	0,78±0,16	0,76±0,12	>0,05	0,08±0,02	0,61±0,12	<0,05

Conclusion

Thus, approbation of the developed complex of means for improving the technique of dynamic elements with rotation in competitive compositions with a hoop, based on the development of speed indicators, confirmed its effectiveness. The effectiveness of turns fulfillment at the end of the forming experiment proved the possibility of directed stimulation of the growth of sportsmanship of female gymnasts, and the increase in the effectiveness of their competitive activity.

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DOI 10.34660/INF.2021.32.67.007

HISTORICAL FOUNDATIONS OF A HEALTHY LIFESTYLE IN PEDAGOGY

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Abstract. *The article deals with the problem of a healthy lifestyle in human development. The authors analyzed the works of domestic and foreign scientists, teachers, psychologists, where the problem of healthy lifestyles is considered from ancient, primitive times to the present.*

Keywords: *healthy lifestyle, development, humanity, health systems, evolution, preschool age, hygiene, prevention.*

Introduction

A person's attitude to his health is evidenced by his ability to preserve life, to fulfill his biological and social destiny.

Man associated his physical condition with mystical, mysterious ideas even in antiquity, when he felt defenseless and helpless in front of natural forces.

For example, in the primitive communal system, such representations were deified with amulets, and health protection measures were in the form of religious rites. It is proved that in the process of evolution, a person observed and made conclusions, noted the cause-and-effect relationships between health, environmental factors, lifestyle, healing and healing properties of nature.

Scientists write that at this stage of human development there was a direct relationship between the state of human health and physical activity, which he had to perform in the course of his life, family life, and community life.

In the slave system, knowledge was also accumulated on the preservation of human health. It is known that already at that time, scientists directed all their strength and knowledge to create health systems, such as, for example, the Chinese "Kon-fu" (about 2600 BC), the Indian "Ayur-Veda" (about 1800 BC), "On a healthy lifestyle" by Hippocrates (about 400 BC) [9, p. 38].

In particular, a harmonious system of health improvement existed in Ancient Sparta, where physical exercises were prescribed and strictly controlled by the state, being obligatory for all citizens. The high level of physical health of the Spartans still remains the standard for all subsequent generations.

Purpose of the study

Analysis of the views, approaches of domestic and foreign scientists, philosophers, teachers and psychologists, educators to a healthy lifestyle.

Materials and methods

Works of scientists, philosophers, analysis, synthesis, descriptive method, deduction.

Many scientific discoveries prove that the main determinant of health is a lifestyle, conscious care of one's health.

The Greek philosopher Aristotle assigned a special place to the upbringing of preschool children. They were allocated three sides of education: moral, mental and physical. According to the famous philosopher, a child up to seven years old should be brought up in a family and, above all, parents should develop the body of their child. The main thing, according to Aristotle, for a child is nutrition, movement, hardening [8].

Having got acquainted with the leading positions of the listed systems, we can conclude that their main idea is not the treatment of diseases, but the formation, preservation and strengthening of health, as well as the use of the body's reserve capabilities for its restoration.

At the present stage of development of society, from the main problems facing civilization, the problem of children's health can be brought to the fore. The health of the younger generation determines the state of society and the state as a whole. References to recommendations for maintaining and maintaining health and preventive instructions can be found in the writings of the philosophers of Ancient Greece. For example, work regimen, daily regimen, rest regimen, home hygiene, proper nutrition and preventive measures [9, p. 80].

Quintilian M.F. believed that a healthy child must be brought up, taking into account his age and individual characteristics. He offered three degrees of teaching, such as imitation, instruction, and exercise. Exercise involves a rational combination of play, exercise and relaxation with the intention of relieving fatigue and maintaining health.

In the Middle Ages, the tasks of raising a child were closely associated with

the tasks of health improvement. V. Caesarea and K. Alexandria were asked to consider the tasks of education in the following directions: the acquisition of habits, the upbringing of a healthy style of behavior and overcoming bad habits [3].

Humanistic pedagogy originated in the Renaissance. Francois Rabelais outlined the ideas of humanistic education in his work "Gargantua and Pantagruel", focusing on the need to maintain the health of children by changing their lifestyle [9, p. 133].

Slavenitskiy E. in his work "Citizenship of children's customs highlighted the idea of taking care of the body, pointed out the need and importance of oral and dental hygiene, showing the means of mechanical cleaning of teeth [3, p.114].

Russian scientist Lesgaft P.F. is one of the brightest representatives of pedagogical science. He outlined the physical, moral and mental conditions for the formation of a healthy child, and also took into account the factors that influence the health and upbringing of the child. The teacher put to the fore the harmonious development of the child, the preservation of his own health, the appropriate combination of mental and physical activity, as the leading condition for the education and upbringing of the child.

The Tatar educator Kayum Nasyri also promoted a healthy lifestyle. He collected medicinal herbs and knew how to store and use them wisely. He used traditional medicine recipes. He was constantly asked for help. The house-museum, in which he spent the last 13 years, hosts meetings of the healthy lifestyle club.

The great Tatar poet Gabdulla Tukay in his works raised the problem of upbringing a healthy lifestyle. In verses ("Cold", "The train is coming") he criticized the problem of drunkenness. G. Tu5kaya was concerned about the physical and spiritual development of children.

Tatar folk tales were strong effective means of educating healthy lifestyles. In the formation of the foundations of a healthy lifestyle for children, such fairy tales as "The Moon and the Sun", "The Old Man and the Lazy Horseman", "Batyr", "Kamyr Batyr", "Four Friends", "The Goat and the Ram", "The Man and the Cat", "The Nightingale "And others are invaluable.

The Tatar people have accumulated many proverbs about health, for example, "If you are rich, your homeland will love you, if you are healthy, your husband will love you"; "Let the head be healthy, and there is a hat"; "My health is my wealth"; "Health is a great wealth", etc. Of course, even if some proverbs have a figurative meaning, we believe that they apply to a healthy lifestyle.

Bekhterev V.M. in his writings noted the dependence of health on education. The scientist pointed out that education has a great influence not only on the development of character, but also on the protection of health, moreover, both physical and mental [2, p.3].

Sukhomlinsky V.A. more clearly approached the problem of maintaining the

health of the child. They were presented with the solution of the problems of raising a healthy child in all the variety of factors of a healthy lifestyle: hardening, morning exercises, outdoor games, work and rest, proper and rational nutrition [8].

Thus, in pedagogy, the need to educate a harmonious, healthy personality was realized, there was a position of understanding the relationship between health and human behavior, however, in the preschool educational institution the task of forming the value of health of preschoolers was not posed, it was solved indirectly through moral and partly hygienic education.

Results

It follows from the above that in pedagogy the problem of upbringing a healthy generation was solved through the organization of separate areas of upbringing. We also found that the need to raise a healthy child has existed since ancient times and is relevant today.

But a more thorough study of this problem during this period was carried out in two directions: systematic observation of children during the entire period of their growth and the study of general clinical and other indicators. Education of the correct attitude to one's health at this stage of the development of science was not singled out as the task of the preschool educational institution.

For the first time, the greatest Russian biologist, doctor Ilya Ilyich Mechnikov expressed the need for the formation of knowledge about a healthy lifestyle in preschool children [3]. In his opinion, the most important thing is to educate the population to legitimately, unmistakably in every situation, make a choice in the direction of what is useful, which promotes health and abandon everything that is harmful. The basis that gives rise to the construction of the building of the need for a healthy lifestyle is the attitude of children to their own health.

Vasily Sukhomlinsky said that taking care of health is also the main job of an educator. The preschooler's spiritual life, which is a component of his worldview, mental development, the strength of knowledge, and faith in his own strength, depends on the optimism, cheerfulness and cheerfulness of a preschooler.

Rina Borisovna Sterkina and Natalya Nikolaevna Avdeeva write that children need to be encouraged to think about their body, about how it works. A child must understand the complex structure of the body, realize the importance of proper nutrition, the importance of personal hygiene and a healthy lifestyle [1, p.52].

According to M.Yu. Stozharova, the health of the adult population is 75% determined by the conditions of its formation in childhood [74, p. 19].

A healthy child quickly forms all the necessary skills and abilities, he better adapts to changing conditions and adequately perceives the requirements for him [10, p. 161].

At this stage in the development of modern science, there are few studies on the problem of forming knowledge about a healthy lifestyle and the formation of a

healthy lifestyle culture in older preschool children (N.G. Bykov, L.G. Kasyanov, M.V. Melichev, O.S. Schneider and others) [4].

Conclusion

Within the framework of our research, it is important to define the concept of "health". There are a huge number of definitions of this concept. But the initial definition is presented in the Charter (Constitution) of the World Health Organization. It sounds as follows - health is a state of complete physical, mental and social well-being, and not just the absence of diseases and physical defects [5, p. 1].

The concept of "healthy lifestyle" appeared relatively recently, in the 70s of the last century. The concept is also not unambiguously defined. Having studied various points of view on this issue, we can say that healthy lifestyle is a human activity aimed at strengthening one's health and preventing various diseases. A healthy lifestyle is a prerequisite and foundation for achieving success in all spheres of human life.

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CONSISTENCY AND CONTINUITY IN VOCATIONAL AND PEDAGOGICAL EDUCATION

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Abstract. *In this article, the author describes the current state of the problem of consistency and continuity in vocational and pedagogical education, as well as illuminates its rationale and the specifics of its implementation.*

Keywords: *education, vocational education, consistency, continuity, logic, content.*

Introduction

One of the most effective factors in the implementation of a continuous education system is provision of consistency between its levels. Therefore, the issue of provision of consistency in education has always been one of the most pressing problems in pedagogy. Today, there is such an urgent problem to be solved in higher pedagogical educational institutions of our country as ensuring the consistency of the content of vocational and pedagogical education. Taking into account the requirements of today's continuous education, it is time to make scientifically and practically substantiated clarifications in the comments on this issue, as well as to ensure the consistency in the content of vocational and pedagogical education.

Purpose of the study

In order to fully imagine and solve the problem, let us first focus on the degree of elaboration of the problem of consistency in pedagogy. At various stages of social development, the issues of effective organization of the educational process and provision of its consistency and coherence have attracted the attention of mature thinkers and advanced educators. Such aspects of organization of education of the younger generation were studied by Abu Ali ibn Sina (Avicenna), Mirzo Ulugbek, Abdulla Avlani, Jan Amos Komenský, Konstantin Dmitrievich Ushinsky and others in their time.

Materials and methods

There are different approaches to defining the concept of consistency in education. A number of researchers have given different definitions to the concept

of consistency. In particular, V.N. Prosvirkin emphasizes that consistency means inexistence of repetitions in new topics not only in form, but also in content, prevention of mechanical repetition of the same exercises and achievement of development of the topic [1: 14].

According to S.L. Rubinstein, the essence of consistency is that there is a correlation between all the stages of the learning process because each stage occurs on the basis of the previous one, constituting its internal conditions [2].

Yu.A. Kustov explained the laws of implementation of the principle of consistency, the most important of which are:

- distinguishing the main stages of personality formation, its quality and types of activities;
- determining the initial and achievable levels of quality or type of activity to be formed;
- identifying the contradictions between the prospects of personality development and its current condition;
- distinguishing the main structural elements (factors, concepts, laws) of the course, section and topic, which must be mastered while studying a particular discipline (subject);
- activating pre-formed basic concepts and methods of activity in students' minds;
- selecting an effective combination of methods, forms and means of teaching, and, on their basis, “transferring” students from the initial level to the established level, i.e. carrying out their management;
- revealing the connection between the concepts being studied and previously acquired knowledge and skills;
- “introducing” newly formed concepts;
- using widely the solution of social and professional problems in the process of forming new concepts [3].

According to U. Tolipov and R. Choriev, consistency and coherence are one of the important principles of didactics requiring the means that make up the content of education: logical connection among syllabuses, methodological recommendations and additional visual materials, the acquisition of new information based on basic knowledge and interdependence in the formation of knowledge, skills and abilities at certain stages of education [4].

Results and discussion

Taking into account the fact that educational activity in higher pedagogical educational institutions is a multifaceted and complex process, it is very important to clearly define the place of interdisciplinary relations in the structure of education in a practical, goal-oriented way. To do this, it is necessary to rationally distinguish the didactic “norms” of interdisciplinary relations not only in the cur-

ricula, syllabuses and textbooks of certain disciplines (i.e. methodology of physics, chemistry, labor education), but also of such courses as general pedagogy and pedagogical psychology.

At a time when the education system is being modernized, it is necessary to radically reform and connect with life the content of the system of vocational and pedagogical education by re-analyzing it and ensuring its consistency.

Studying the provision of consistency of the content of vocational and pedagogical education, as well as consistency and interdisciplinary relations between levels of education (bachelor’s degree and master’s degree) and courses in higher pedagogical educational institutions of our Republic allows revealing the essence of the problem. The main feature of consistency between the levels of education is that the content of the next level of education (master’s degree) does not only directly continue the content of the previous level (bachelor’s degree), but also is reflected in the repetition and enrichment of certain disciplines (subjects) in an expanded and deepened way in terms of content. Such consistency should first be reflected in (model, working) state educational standards and syllabuses. The effectiveness of the lesson, its targeted structure depends in many respects on the provision of consistency between state educational standards and teaching materials. Without providing such consistency, it is impossible to increase the effectiveness of education and create a mechanism for the practical application of state educational standards.

It is important to ensure the interaction between the courses and correctly distribute teaching materials in order to provide consistency in the content of vocational and pedagogical education in the system of continuous education. At the same time, in the stages and courses of the system of professional and pedagogical education, knowledge should be logically complementary, the content of subjects should be aimed at ensuring consistency, and there should be a certain sequence and an integrated system in the structure of teaching materials.

Consistency means the placement of teaching materials in a certain sequence and system, reliance on existing knowledge in the acquisition of knowledge, application of teaching materials to a certain extent into the next stages and continuation of the levels of the educational process. It helps design the materials of the subject and effectively select types of activities for the acquisition of the basics of the discipline (subject). In this process, it is important to take into account the following two factors: the content, logic of a particular subject (aspects that determine the existence of consistency in the subject – the concepts, laws and evidences that make up the content of the subject; actions gradually revealing the essence of previously and later acquired knowledge of a particular field in a certain sequence) and the laws of the process of knowledge acquisition (action, practice that does not allow incorporation of didactically unprocessed knowledge of a particular field

directly into the subject).

Consistency and continuity are characteristic of the curricula of educational institutions providing continuity of education and ensuring that students in each type of education receive knowledge to a certain extent.

Provision of interdisciplinary relations in the system of vocational and pedagogical education makes it possible to interconnect concepts, laws and theories of different disciplines, to form general scientific, professional and pedagogical knowledge through these relations, and to deepen and enrich their content.

Conclusion

To provide the consistency of the content of vocational and pedagogical education, it is necessary to adhere to the following guiding principles:

- compliance of professional pedagogical education with the requirements set by the state and society for the quality of personnel training;
- compliance of all subject syllabuses in the system of vocational and pedagogical education with the requirements of state educational standards;
- teaching system and the forms, methods and means of education should provide the integrity of students' learning activities;
- themes in syllabuses should consider students' intellectual, professional, spiritual and cultural development;
- provision of consistency between courses in the system of vocational and professional education;
- provision of interdisciplinary integration in vocational and pedagogical education;
- provision of interthematic consistency in subject syllabuses of the system of professional and pedagogical education:
 - formation of teaching materials in syllabuses on the basis of the principle of simple to complex;
 - consistent and coherent expression of theoretical, spiritual and moral knowledge aimed at forming the idea of national independence and national ideology in the context of education.

A characteristic feature of consistent vocational and pedagogical education is that it forms new knowledge, skills and abilities in students on the basis of previously acquired knowledge and skills, improves their interaction and, in turn, further deepens, expands and consolidates previously acquired knowledge, skills and abilities while presenting new knowledge.

Provision of consistency of the content of vocational and pedagogical education depends not only on the consistency between the levels, courses and content of education, but also on the consistency of the educational process, i.e. the development of thought of the subject that implements it and the object that is considered its end result. After all, no matter how thoroughly teaching and meth-

odological sets might have been developed, they are applied by teachers directly into practice.

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DOI 10.34660/INF.2021.20.52.009

VIOLATION OF THE RIGHTS OF CONSUMERS OF FINANCIAL SERVICES BY SCANDINAVIAN BANKS AND THE CLOSURE IN FINLAND OF BANK ACCOUNTS OF COMPANIES WITH RUSSIAN SHAREHOLDERS

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Abstract. *The article examines the violation of the rights of consumers of banking services in Finland by companies with Russian shareholders. In accordance with the current Finnish banking policy and internal bank regulations, the provision of basic banking services is carried out to clients with a permanent residence in the European Economic Area. In violation of the Law on Credit Institutions, banks in Finland stop banking services to companies with Russian shareholders, including those not subject to EU or US sanctions, permanently residing in the EEA and having dual Russian and Finnish citizenship. Closing bank accounts makes it impossible to exercise the right to work guaranteed by the Finnish Constitution. While the US dollar is one of the main currencies in settlements between states, the US Treasury will control not only dollar transactions, but also the very principle of the functioning of the world banking system. To counter the influence of the United States from American institutions and reduce their dominance in the EU financial system, it is necessary to create a European Monetary Fund, a SWIFT system with an increase in the share of the euro in international settlements as an alternative world currency.*

There is a need to reform the Finnish justice system, based on international human rights standards and instruments, with an effective, impartial and accountable judiciary and mechanisms to oversee the justice system.

Keywords: *rule of law, right to banking, conflict between international and national law, US sanctions.*

In early 2019, the Scandinavian banks Nordea Bank and SEB AB received a request from the New York Department of Financial Services (NYDFS) on the money laundering investigation at Danske Bank, as well as on the bank's relationship with Mossack Fonseca. Particular attention was paid to bank accounts with

Russian capital. Some branches of Scandinavian banks in Latvia and Estonia also became the epicenter of financial scandals, investigations in which led to a chain reaction of claims against banks in Finland, Sweden and Denmark. According to the report of the international law firm Clifford Chance, in 2014–2019, clients of the Swedish bank Swedbank made bank transfers in the Baltic countries in the amount of over 37 billion euros¹.

And at the same time, Russian companies in Finland began to receive messages about the closure of bank accounts without explanation.

With reference to the Law on the Prevention of Money Laundering and the Financing of Terrorism (444/2017), the bank may close the account and refuse to provide banking services. Pursuant to the Law on the Implementation of Certain Obligations by Finland as a Member of the United Nations and the European Union (659/1967), no obligations or temporary injunctions made in violation of this Law or any provision based on or circumventing it shall be enforceable².

According to the Finnish Credit Institutions Act, banks are required to provide basic banking services to individuals residing in the EU or the European Economic Area (EEA). Section 15, § 6, paragraph 1, states that a payment service bank must provide an account for basic payments in euros and provide payment services to individuals legally residing in an EEA country, subject to subparagraphs 6a and 6b of this paragraph.

In reality, however, the political dimension plays a role in the decision by banks to close accounts for foreign-owned companies, regardless of whether they have permanent residence, Finnish citizenship or tax residency in the EU or EEA.

In accordance with the current Finnish banking policy and the internal instructions of banks, the provision of banking services is carried out to customers permanently residing in the European Economic Area³.

So, in 2017-2018, the Scandinavian banks Svenska Handelsbanken AB, Nordea Bank Abp, Danske Bank and OP Yrityspankki Oyj banks refused to service private payments of the former co-owner of Hartwall Arena Helsinki and the Finnish hockey team Jokerit Boris Rotenberg, who is under US sanctions. The Helsinki County Court, by a decision of January 13, 2020, dismissed Boris Rotenberg's claim against the above banks. The court ruled that Boris Rotenberg was included in the SDN and OFAC's Foreign Assets Control List of special categories and prohibited persons and did not reside permanently in the European Economic Area and recognized the financial risks of Scandinavian banks⁴.

¹Swedbank epäonnistui rahanpesun torjunnassa – epäilyttävää rahaa kulki pankin tilien kautta vähintään 37 miljardia euroa. YLE. 23.3.2020. URL: <https://yle.fi/uutiset/3-11271107>. (appeal date:15.5.2021)

²Laki eräiden Suomelle Yhdistyneiden Kansakuntien jäsenenä kuuluvien velvoitusten täyttämistä. 659/1967. URL: <https://www.finlex.fi/fi/laki/alkup/1967/19670659>. (appeal date:16.5.2021)

³Finnish Credit Institutions Act, section 6 (1) chapter 15.

⁴Zhilkin V.A. "US sanctions and the right to use bank accounts in European banks for foreign

Section 15 § 1 point 6 of the Credit Institutions Act states that a bank providing payment services must provide an account for basic payments in euros and provide payment services to persons legally residing in an EEA country, subject to subparagraphs 6a and 6b of this paragraph. In the Rotenberg case, the court stated that the plaintiff was unable to prove that he lived in the EEA, and therefore could not be guaranteed to receive banking services from banks in Finland. According to the Law on Payment of Payments, "The bank may refuse to execute a payment order only if the conditions for the execution of the payment order agreed in the agreement are not met or are not otherwise provided for by law"⁵.

In violation of the same Law on Credit Institutions and in a series of many similar cases of violations of rights to banking services in November 2020, the Finnish bank OP Yrityspankki Oyj stopped banking services for Indeq Oy, a company registered in Finland in 1996, whose shareholders and management are not included in the sanctions list. OFAC, not subject to EU or US sanctions, permanently resided in the EEA and held Finnish and Russian citizenship. The company's management, as well as all business partners, underwent due diligence.

The bank did not indicate the reasons for termination of the agreement, referring only to clause 1.10 of article 19 of the standard agreement with the bank "Term and termination of the agreement". This condition gives the bank the right to terminate the agreement with one month's notice under any circumstances without giving reasons and without taking into account the situation and interests of the bank's client.

The company is a distributor of the international company Boart Longyear, which mainly imports mining equipment from the USA and Canada to Finland and then sells it to other countries. The annual turnover of the company was more than 10 million euros per year with a constant high and stable profit.

At the same time, OP Yrityspankki Oyj closed the right to use the account and a subsidiary in central Finland, through whose accounts only sales of Boart Longyear products were carried out within Finland, which led to the dismissal of all employees, grossly violating the right to work guaranteed by the Finnish Constitution and to support oneself on the income from his chosen work⁶.

The company will face many years of litigation with review of decisions in Finland. But taking into account the lengthy litigation in Finland⁷ new Western

citizens not residing in the European Economic Area." Russian Journal of Legal Research. Volume 7, №1 2020. P. 86-93.

⁵Maksupalvelulaki, 30.4.2010/290. §41.

⁶The Constitution of Finland. 11 June 1999. Chapter 2. Section 18. Everyone has the right, as provided by an Act, to earn his or her livelihood by the employment, occupation or commercial activity of his or her choice.

⁷Case of Kari Uoti v. Finland, Judgment of 23 October 2007. The ECHR found a violation of Article 6 §§ 1 and 3 (d) of the Convention on account of the excessive length of the proceedings of 11 years and 7 months.

companies will appear on the market.

Earlier, on September 23, 2020, the US Treasury Department imposed sanctions against Finnish citizen Nikita Kovalevsky and Optima Freight Oy registered in Finland and three other companies, which also led to the impossibility of further activities of companies in Finland and the dismissal of more than 100 employees.

Now, referring to the case of Boris Rotenberg, the bank stopped servicing company accounts and personal accounts of a Finnish citizen permanently residing in the EU, who moved with his family as a teenager to Finland in the early 90s.

Representatives of the US Bureau of Industry and Security (BIS), which promotes the economic interests and national security of US high technology, spoke with Optima Freight Oy customers in 2012 and 2014 on the basis that US goods are shipped to Russia via Finland.

In the spring of 2019, BIS representatives worked for three days in the office of Kovalevsky's company and reported that the company was transporting American cargo, so the company's activities must comply with American laws.

Finnish logistics and forwarding companies and their owner Nikita Kovalevsky were included in the US sanctions list in the fall of 2020. The bank also closed Nikita Kovalevsky's access to the account and even to the savings account of his daughter.

In response to his appeal to the President of Finland, Kovalevsky received a response from the President's Legal Adviser that the President does not have the authority to resolve such issues.

Earlier, in September 2018, one of the major police operations to detain employees and seize property of the Finnish company Airiston Helmi Oy by Russian businessman Pavel Melnikov was planned for several months, as the President of Finland and the Prime Minister were informed about in advance. The operation involved about 400 members of the Central Criminal Police (KRP), the Southwest Finland Police and the Defense Forces. The police carried out a series of searches of the home and company, examinations and seizures of evidence were carried out in 17 sites on the islands and in Turku. The owner and member of the Board of Directors of the company were arrested 3.5 million euros in cash.

During his visit to New York, Finnish President Sauli Niinistö said that "he has long been concerned about the acquisition of real estate by Russians in the strategically important territories of Finland." However, the President said that the Finnish state has no reason to confiscate the territory belonging to Airiston Helmi Oy in cases where transactions were made several years ago⁸.

According to Mikko Kärnä, a former border guard officer and reserve deputy of the Finnish Center Party, and according to information he received from the Finnish Defense Ministry, it is possible to repair Russian submarines in the Baltic

⁸Petri Burtsov. Presidentti Niinistö: ”Olin tietoinen Turun saariston operaatiosta jo pitkään”. YLE. 24.9.2018. URL: <https://yle.fi/uutiset/3-10420627>. (appeal date:16.5.2021)

Sea in this port. Mikko Kärnä also reported on the information received from official sources that the management of Airiston Helmi Oy has strong ties with the FSB⁹. However, no references to sources or contacts supporting this assumption were provided.

The Russian businessman is suspected of a tax crime and money laundering and denies the charges. The defense immediately filed a lawsuit to cancel the seizure of property. On 19.09.2019. the Turku Court of Appeal ruled on the secrecy of the case for a period of 25 years and upheld the seizure of property.

When considering the claim for the cancellation of the arrest on January 15.01.2021. the county court in a closed court session extended the term of the property arrest and the period for the investigation of financial crimes until 17.01.2022.

The role of the Finnish media in reporting on violations of basic human rights and the rights of users of banking services should be emphasized. The publication of articles in the media and interviews with Russian shareholders of companies in Finland raised the discussion of the state of the right-wing system in Finland and the right of a citizen to work enshrined in the Constitution. It is emphasized that it is the state's responsibility to protect and promote the rule of law, including by taking measures to ensure equality before the law, fairness in its application, as well as internationally recognized human rights in the framework of its activities.

One of the first large and lengthy investigations with the seizure of property and the closure of accounts of Russian companies in Finland began in 2001. According to the Finnish tax department, entrepreneur Larisa Lisitsyna topped the list of the richest women in 2004 and was eighth in the list of all taxpayers in Finland.

The preliminary investigation began in January 2001 after two statements by the police on suspicions of serious accounting crimes in the Finnish firms of the Lisitsyn family. At the very beginning of the investigation, the Central Criminal Police informed 48 partners from 12 countries that the Lisitsyn companies were suspected of money laundering and accounting crimes. Western partners immediately announced the suspension of the joint business pending the end of the investigation.

The result of a long-term preliminary investigation and a three-day trial with the examination of all the evidence presented by the defense, the testimony of witnesses and experts was the message of the county prosecutor about the complete rejection of the previously brought charges and the complete termination of the criminal case. On 21.12.2017 the Lappeenranta County Court issued an acquittal on all charges¹⁰.

⁹Minna Ala-Heikkilä. Entinen rajaupseeri väittää saaneensa sisäpiiritietoa KRP:n suuroperaatiosta: ”Venäjällä on tutkakaalustoa ja sotasatama Airistolla”. Satakunnan kansa. 23.9.2018. URL:<https://www.satakunnankansa.fi/kotimaa/art-2000007055396.html>. (appeal date: 16.5.2021)

¹⁰Lappeenranta County Court Decision R 06/16 dated 21.12.2007. The author took part in the

It should be noted that the analysis of statistical data in Finland shows that the closure of bank accounts with the impossibility of further doing business leads to an outflow of foreign investment from companies with Russian owners, as well as companies with owners from China and Arab countries. But the political component, sanctions diktat and national interests in countries strategically important for US interests turn out to be decisive in making decisions by Finnish banks and closing accounts of foreigners from the list of countries that threaten America's interests.

According to Kari Kuusiniemi, President of the Supreme Administrative Court, Finland should also be prepared for the fact that those in power at some point in the future may encroach on the rule of law. "A large group of people believed in the falsification of the US election results and were ready for an uprising. If this can happen in the United States, should we be prepared for it as well? We are not insured against the fact that something similar can happen here (in Finland)"¹¹.

The Finnish government made the judiciary loyal by dramatically increasing the number of judges and forcing the old judiciary to resign, lowering the retirement age. According to Kari Kuusiniemi, non-democratic decision makers can also unduly influence the courts in Finland if the independence of the courts is not properly enshrined in the Constitution. A similar procedure is possible in Finland, since the Constitution does not determine the retirement age of judges or the number of judges of the highest courts.

According to the judge from Finland to the ECHR Pauliine Koskelo,¹² "the rejection of the rule of law in several European countries over the past decade is a very serious problem." Pauliine Koskelo believes that they may inappropriately try to influence the courts, including through funding. Budgetary power is vested in the government and Parliament, and funding for the judiciary is not sufficiently secured¹³.

And already in April 2021, the Ministry of Justice of Finland announced that it considers it possible that in the future an attempt may be made to undermine the rule of law in Finland as well. The Ministry of Justice intends to assess whether the independence of the judiciary in Finland will be ensured if non-democratic political forces come to power and whether the courts will retain their independence

preparation of materials for the defense of this case.

¹¹Lasse Kerkelä. Suomen tuomioistuinten riippumattomuus ei välttämättä kestäisi epädemokraattisesti toimivaa hallitusta – KHO:n presidentin mielestä asiasta on käynnistettävä pikaisesti selvitys. Helsingin Sanomat. 6.4.2021. URL: <https://www.hs.fi/kotimaa/art-2000007901640.html>. (appeal date:12.5.2021)

¹²Former Head of the Legal Directorate of the European Investment Bank EIB, Judge of the Supreme Court (2000-2005) and Chief Justice of the Supreme Court of Finland (2006-2015). Since January 2016 Judge of the ECHR from Finland.

¹³ Kerkelä Lasse. Tuomioistuinten riippumattomuus voi murentua. Helsingin Sanomat. Sivut A6-7. 6.4.2021.

even if the future government questions the rule of law¹⁴.

We also note that the legislation of Finland, Sweden and Denmark does not give national banks the right to unilaterally close client accounts or refuse to carry out financial transactions due to the requirements of American law.

In Finland, as well as in the United States, conflicts between the Constitution and an international treaty are resolved in favor of the Constitution. In accordance with the supremacy of the Finnish Constitution, if a regulation or other by-law is in conflict with the Constitution or another law, its application by a court or other authority is not allowed (Article 107).

The US sanctions regulations are not legally binding in Finland, but in practice banks are also guided by minimizing their own risks of disconnection from using the services of US correspondent banks paid in US dollars.

But while transactions in dollars pass through the US banking system, the Ministry of Finance will control, block transactions and oblige banks to pay fines. European banks are not under US sanctions, but each year they agree and pay billions in fines.

It is necessary to reform the justice system in Finland, based on international standards and human rights documents, to create an effective, impartial and accountable judicial system, to develop an integrated approach to criminal justice and to establish mechanisms to control the justice system.

By closing accounts for foreign investors and depriving them of the right to work, at the same time, under the slogan of a shortage of labor and within the framework of quotas for granting refugees in the European Union, Finland accepts a huge number of refugees, providing them with full social support, paying subsidies and shortening the time for obtaining a permit for residence.

According to official statistics, the number of all migrants in Finland in 2019 was 383116¹⁵.

According to the Minister of the Interior of Finland Maria Ohisalo, it is impossible to determine the exact number of illegal foreigners in Finland. According to the University of Turku, in 2018, the number of illegal immigrants who received MIGRI's refusal to grant asylum and a decision to expel, but did not leave the country, could reach up to 8000 people.

International law contains sufficient grounds for declaring unlawful unilateral measures. And Finland, as a UN Member State, must observe and support only those sanctions that are provided for by a decision of the UN Security Council in accordance with Chapter VII of the UN Charter¹⁶.

¹⁴Ibid.

¹⁵Source: <https://www.globaldetentionproject.org/wp-content/uploads/2020/11/Finland-Detention-Data-Profile-2020.pdf>. (appeal date: 12.5.2021)

¹⁶UN Charter. Article 39 Chapter VII.

URL: <https://www.un.org/ru/sections/un-charter/chapter-vii/index.html>. (appeal date: 4.5.2021)

And in conclusion, it is necessary to note an important judicial precedent for Russian owners of foreign companies in the field of sanctions disputes in the United States with the application of the Brady Doctrine (*Brady v. Maryland*, 373 U.S. 83, 87-88, 83 S. Ct. 1194, 10 L. Ed. 2d 215 (1963) in the case of *United States v. Ali Sadr Hashemi Nejadin*, 18 Cr.224 (AJN), which establishes the inadmissibility of the prosecution's concealment of evidence in criminal proceedings.¹⁷

So, on July 17, 2020, Ali Sadr achieved the termination of the proceedings against him with the use of prejudice and the cancellation of the jury's verdict on finding Sadr guilty and began the process to recover damages from European regulators and restore his business reputation.

This judicial precedent is also possible to be applied in Finland in cases of Russian citizens who are at various stages of criminal prosecution for violations of sanctions or export control rules in the United States.

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DOI 10.34660/INF.2021.56.87.010

SOCIOCULTURAL AND PSYCHOLOGICAL PROBLEMS OF FOREIGN STUDENTS OF RUSSIAN UNIVERSITIES IN THE PROCESS OF ADAPTATION

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Abstract. *In this article, the authors tried to determine the role of sociocultural and psychological adaptation in the educational process of foreign students in Russian universities. The main stages of adaptation are highlighted and the problems arising at each stage are identified. The factors that have a significant impact on the academic performance of foreign students are considered.*

Keywords: *sociocultural adaptation, psychological adaptation, international education, training of foreign students, interaction, educational migration, educational process, interpersonal communication.*

In recent decades, Russia has become part of a single global educational and cultural world. The expansion of individual freedoms and opportunities gives a person the right to form personal social and professional choice based on internal needs and personal interests.

The relevance of this topic is due to the growth of educational migration and the related problem of adaptation of foreign students to the new socio-cultural environment.

The purpose of this article was to study the factors that influence the adaptation process of foreign students in a Russian university.

The work used methods of analysis and synthesis, structural and functional,

and to obtain empirical data - interviewing and questioning. In the course of the work, the factors influencing the adaptation process of foreign students in a Russian educational institution were identified. First of all, these are individual psychological qualities of a person, personal sympathies and antipathies of students, as well as religious, political, social, ethnopsychological and spiritual characteristics. As a result of the study, the authors came to the conclusion that it is necessary to develop adaptation programs and introduce them into the educational process, taking into account the identified problems.

The development of the modern world involves the expansion of the boundaries of interaction between different countries and cultures. This process covers various areas of social life of all world states, including the sphere of education. Modern changes in geopolitics and cultural and social sphere of Russia have had a great impact on educational (training) migration. Thousands of young people come to the Russian Federation annually to gain knowledge in our country. Medical, engineering and economic, pharmaceutical and technological specialties are very popular among foreign students. [9, p.124]

In connection with the increase in educational migration, the interest of scientists in the study of problems arising among foreign students has increased. Authors such as M. Belsky, S.V. Berezin, S. Bonner, V.V. Gritsenko, N.M. Lebedeva, K. Oberg, A.V. Perevedentsev, V. Petersen, E.E. Written, E. Ravenstein, L.L. Rybakovsky, V. Linneweber and others, investigate the socio-psychological problems of modern educational migration. Despite a considerable amount of work in this area, the problems associated with educational migration have not yet been fully studied.

The main task facing foreign students coming from another country to Russia today is to get an education. A student temporarily studying in another state is like a “visitor” who, after receiving an education at a university, returns to his home country, where he implements the accumulated baggage of knowledge and experience. Researchers note that it is these foreign “visitors” who experience great difficulties in the process of adaptation: since the time of their stay in a foreign country is limited by the period of study, they cannot fully assimilate the values and norms of the culture of the host state [4, p. 84]. At the same time, “the process of socio-psychological adaptation cannot be separated from the development of the personality, its formation. On the contrary, it is closely connected with the harmonious development of individuality” [3, p.220].

During their studies, foreigners form a variety of social ties and interactions with a new society. Their nature, as a rule, affects not only the speed and success of adaptation, but also the effectiveness of a foreign student's study and the level of knowledge and skills acquired by him [5, p. 154].

At present, young people from different countries arrive in the Republic of

Adygea for the preparatory faculty. They want not only to study Russian, but also to further get an education at the Maikop State Technological University. In the process of adapting to a new environment, foreign students have many problems, both psychological and related to educational activities, gaining knowledge.

The "Big Psychological Dictionary" defines social adaptation, firstly, as the process of active adaptation of an individual to environmental conditions, and, secondly, as a person's state, reflecting his ability to perform specific biosocial functions. These include an adequate perception of the surrounding realities and one's own organism, as well as an adequate system of relations and interaction with others [2, p.19-20].

Based on this, we can say that social adaptation is a complex process of interaction between a person and the environment, (first of all, the social environment), the results of which can be different:

- the actual adaptation of a person to the social environment of life, which allows him to function more or less successfully as an individual and participant in various social situations;
- active assertion of a person in a social environment, which allows him not only to function successfully, but also to develop personally in communication and activity;
- conflict interaction between a person and the environment, leading to disadaptation: functional disorders, loss of internal personal activity, high mental tension, etc. [1, p. 344-345].

After arriving in another state, everyone is in a state of stress caused by “culture shock” [11, p.178]. Students need not only to adapt to a different climate, food, unusual living conditions, lack of family and friends, but also to a new status, unusual traditions, cultural rules, values and norms adopted in a foreign country. That is why one of the most important tasks of the university is the adaptation of foreign students to the new educational and cultural environment.

The need to take into account ethnopsychological characteristics in working with foreign students from different regions is beyond doubt. Recently, the number of students from neighboring countries (Turkmenistan, Tajikistan, Uzbekistan), African countries (Chad, Algeria), the Middle East (Syria, Palestine), South Asia (Nepal), Latin America (Brazil.), etc. has increased.

In order to find out the range of problems faced by foreign students in the Republic of Adygea during adaptation, the authors conducted a socio-psychological pilot study using the method of interviewing and questioning. The sample included foreign citizens studying at different faculties and specialties of the Maikop State Technological University. In total, the study involved about 100 students, as well as teachers who work with them.

In the course of the work, it turned out that the process of adaptation to studies

at the university is difficult for many students. Thus, 78% of the respondents noted the problems of the language and cultural barriers that arise during social contacts with the local population. For 65% of respondents, adaptive difficulties are caused by the new climate and the lack of familiar products. And 53% of the respondents pointed to the discrepancy between the style of dress adopted in their homeland and manners of behavior in public places.

Active interpersonal communication, new communication links can exacerbate the prejudice against foreign citizens on the part of the local population. That is why it is required to find out under what conditions interethnic interaction can contribute to the most comfortable communication and reduce the likelihood of conflicts.

As a result of the research carried out among students, to the question of the questionnaire: “What difficulties do you face in communicating with fellow students?” - it was found that

- 79% of the respondents indicated that they did not experience difficulties in communication.

- None of the respondents faced prejudice from others,

- 15% - noted that communication develops in different ways and 6% - students do not communicate.

At the same time, to the question - "Who is the easiest for you to establish contact with?"

48% indicated that it is easier for them to establish contact with Russian students, and 52% - it is easier for them to have contacts with foreign students from other countries.

The composition of students in terms of their intellectual level is rather heterogeneous. Students from Central Asia (Tajikistan, Turkmenistan) mostly have a not very high level of general education, in connection with which they feel insecure and therefore attach great importance to a comfortable psychological environment in the classroom, appreciate the teacher's desire to help. This stimulates them, emotionally supports them, and contributes to an effective result.

What difficulties do students face directly in the learning process?

As a rule, all lectures cause feelings of frustration, tension and panic, because the student does not have time to assimilate scientific information transmitted at a fast pace in a foreign language. The fear of making a mistake, the fear of ridicule from fellow students lead to the body's natural defensive reactions to stress: anxiety, confusion, doubts, worries, introversion. The implementation of lecture notes is accompanied by the fear of the teacher to discover a lack of understanding of the material and helplessness in a competent and clear presentation of their ideas in writing.

At the same time, reading does not cause any particular difficulties for foreign

students, however, the analysis of the text, the implementation of various tasks on its content create certain difficulties and therefore lead to apathy, boredom, discipline violations and, ultimately, reluctance to fulfill the teacher's requirements. No less difficulties are caused by oral questioning on the topic studied. Doubts about the correctness of the answers, the lack of vocabulary in the presentation of the learned material, the fear of making a mistake - all this causes a state of prolonged stress.

To the question of the questionnaire "Is it easy for you to tell educational information?" students responded as follows:

- 24% have difficulty in presenting educational material.
- 3% students cannot answer in front of the audience,
- and 12% are able to answer only to a teacher without a group.

However, the majority - 58%, can quite easily present the studied material. This is confirmed by the teachers working in these groups.

At the same time, only 10% assess their knowledge of the Russian language as good. A 90% majority indicated that they do not speak Russian poorly, although they occasionally experience difficulties.

Students experience academic failure and stressful situations in different ways. To the question "How do you react to failure?"

- 54% respondents answered that they experience failures inside themselves, trying not to show emotions;
- 20% are very emotional, can show violent reactions;
- 26% try to calmly solve the problem, without showing emotions, know how to manage them.

However, the lives of young people are not limited to their studies. With whom do the guys from other countries spend their free time?

Free time from study 58% of respondents prefer to spend with their compatriots, 27% - vacation with friends from other countries, and only 15% spend leisure time with Russian students.

But the life of young people is not limited only to their studies. «Who do you spend your free time with?»

- 58 % of respondents prefer to spend their free time with their compatriots,
- 27% - relax with friends from other countries,
- and only 15% - spend leisure time with Russian students.

It should be noted that young people who come to study are characterized by some ethnocentrism. It is especially noted in girls. They come to Russia less than guys, they are more shy, so most of their free time is spent at home (at the place of residence).

Respondents' answers to the question: "With whom is it easier for you to build personal relationships?" Were as follows:

- 47% of the respondents are ready to build their personal relationships only with their compatriots;
- 38% appreciate representatives of the opposite sex from Russia (mostly men)
- and 15% of the respondents are ready to build relationships with representatives from other countries.

In the process of studying the issue of adaptation of foreign students of the Maikop State Technological University, it was found that a number of factors affect the socio-psychological interaction of representatives of various ethnocultural groups. These are, first of all, individual psychological qualities and personal sympathies-antipathies of students, as well as religious, political, social, ethnopsychological and spiritual characteristics of the host society.

Stereotypes and mental attitudes, as well as a small life and communicative experience of foreign youth, have no less influence. That is why further study and specification of all of the above factors is required.

As a result of the analysis, it can be stated that the system of training foreign students needs to be further improved. It can be recommended to develop for foreign students of the first year of study exemplary adaptation programs of a socio-psychological, communicative orientation that can help harmoniously adapt and successfully interact with the local society.

Also, an effective and successful way to implement adaptation programs will be the development and implementation of psychological trainings in the educational process, which will include blocks aimed at a successful process of adaptation to the situation.

Knowledge of the psychological characteristics and mental attitudes of students allows the teacher to navigate in various situations of communication, prevent misunderstandings and enrich the range of pedagogical interaction.

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SYMBOLS OF THE FAIRY TALE "CHEREP-TEREM" (FROM THE "HISTORY OF SYMBOLS OF SLAVIC MYTHOLOGY")¹

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Abstract. *This report is part of a research work in the field of symbolism of Slavic mythology. Developments on this topic were repeatedly presented by the author at various conferences of past years [Zaporozhets 2020 a), b), c), d), e)]. Today we will continue the study of the symbols of the figurative mythological structure based on the fairy tale "Cherep-terem" from the book by Yu G. Kruglov [Kruglov 1992], who published in his collection the best examples of Russian fairy tale folklore in the arrangements of A. N. Afanasyev, I. A. Khudyakov, D. N. Sadovnikov, N. Ye. Onchukov, D. K. Zelenin and other famous authors. In our report, we will briefly consider the symbolism of the characters in the fairy tale and note the pattern in the development of its plot.*

Keywords. *Children's folklore, symbolism of fairy tales, mythology.*

In previous reports at conferences, the author has repeatedly considered the figurative structures involved in different genres of Russian folklore from the point of view of their symbolic orientation. In this talk, we will briefly consider the symbols of the Cherep-terem fairy tale. We will also mention some versions of the tale, which we will not decipher in detail.

Summary of the first option

... A fly climbed into a pot of sour cream and began to live there. They alternately asked to her and remained with her to live "in terem": a flea, a mosquito, a cockroach, a lizard, a mouse, an ermine, a hare, a fox, a wolf and a bear. But the bear crushed terem. That is, there are only 11 characters. Thus, it is quite obvious that in this case, as in the previous deciphered myths, we are entering an annual calendar listing twelve months. Here, most likely, there are only eleven characters,

¹Cherep" meaning "pot, crock". Terem - Little lovely house.

due to the simple loss of one symbol, due to the destroyed form of myth that has come down to us.

For example, A. N. Afanasyev has similar versions of a fairy tale [Afanasyev 1985], with the presence of such symbols as "louse", "frog", "dog", the number of characters in which varies and there are much fewer of them (6, 9 persons ...). All of this points us to a shattered form of myth, as highlighted in previous studies. Fairy stories have come down to us in a very destroyed form. Moving from one region to another in a large period of historical time, they acquired new, those symbolic signs that were characteristic of this particular area (for example, "ermine"), or lost them. Therefore, a strict binding of ALL symbols to any period of time is not worth doing, although there are stable symbols-animals, symbols-plants, etc... Basically, these are symbols attached to *turning points* of calendar structures (for example, winter and summer solstice ...).

So, if we restore this version of the fairy tale, then we will get a complete picture of the symbols of the annual solar circle.

Let's write down the symbols of the fairy tale by month:

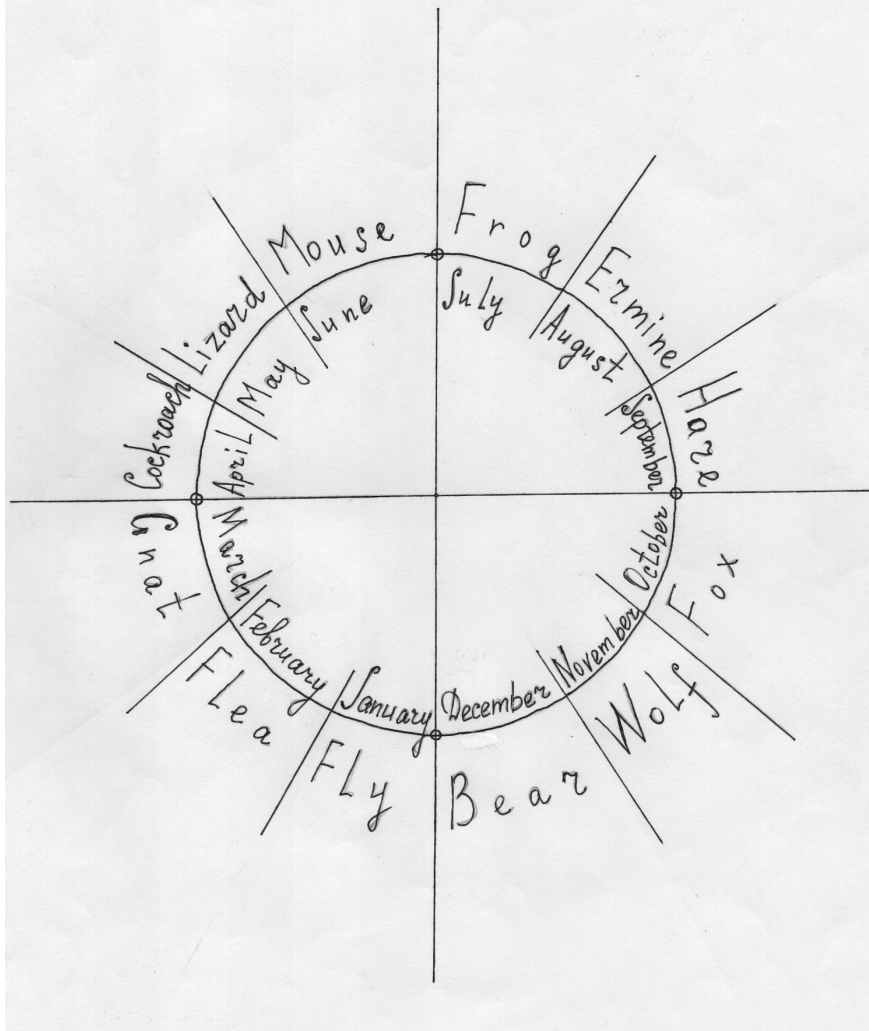
1. Fly – January;
2. Flea – February;
3. Mosquito – March;
4. Cockroach – April;
5. Lizard – May;
6. Mouse – June;
- [7. Frog – July];
8. Ermine – August;
9. Hare – September;
10. Fox – October;
11. Wolf – November;
12. Bear – December.

Here is the entire "list" of the symbols of the months in this plot.

It is also interesting to note that in this case we do not have a decrease in symbols after the point of the summer solstice, as we observed, for example, in the fairy tale "The Old Man and the Wolf". We can find such a development of images in other genres of folklore. For example, in the game "Magpie", where the score goes not from thumb to little finger, but on the contrary, and ends with the words turned to the thumb: "And you, Fat guy, wait at the gate!" (ITI), comment № 1.

Thus, having examined another fairy tale plot, we saw the regularity of the location of certain fairy-tale characters-symbols, and not their spontaneous appearance in the myth. This interested the author, as a certain law that existed in ancient times, and which we have to study in the future.

Scheme



Comments

1. The storyteller performed a version of the game, showing how, first, the baby's palm was clenched into a fist, and then, unclenching her fingers – "The magpie fed the guests."

– Magpie, magpie,
Where've you been?

– Far away!

Cooked porridge,

Feeding guests:

Gave some to this one,

Gave some to this one,

Gave some to this one,

Gave some to this one,

And you, Fat guy,

Wait at the gate!

Here our grandmother Natalya was like that, she told us all the miracles: "Come on, squeeze the fist, squeeze the fist" – and begins to "cook porridge", then feeds, "And you, Fat guy, wait at the gate!"

List of performers

ITI – Ilyina Tatyana Ivanovna, born in 1925. Originally from the Moscow region, Taldom district. In Moscow on business. Recorded by V.V. Zaporozhets in Moscow in 1994.

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ETHNOCULTURAL EDUCATION IN RUSSIA

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Abstract. *The article examines the main characteristics, analyzes the possibilities and tasks of ethnocultural education in Russia. The relevance of the chosen topic is due to the task of preserving the national identity of various peoples living in Russia. The purpose of this article is to analyze the system of ethnocultural education in Russia. The methods of historical and comparative analysis of historical and cultural processes are used in the work.*

Keywords: *education, ethnocultural education, levels of education, ethnopedagogy, culture, ethnocultural development of the individual, ethnos, nation, ceremony, ritual.*

Education is the development of the scientific and cultural heritage of all mankind. It is a multifaceted phenomenon with a complex structure. In practice, this complex concept is divided into a number of specific "formations": by level - primary, secondary, higher; content - natural science, technical, humanitarian; on a territorial basis - municipal, regional, federal. In this list, ethnocultural education also takes its special place, aimed at the development and preservation of specific national (ethnic) historical knowledge and values by an individual. This type of education is of great importance in such multinational states as Russia.

The concept of ethnos has many meanings. The most popular definitions of an ethnos indicate the unique features of the language and psyche of its members, their spiritual unity, their awareness of their differences from other similar formations [1]. These signs are present in all historical forms of the existence and development of an ethnos (clan, tribe, nationality and nation).

The catalyst of nations is capitalism, which, in the pursuit of profit, organizes a common market for similar peoples. The common market leads not only to a

common life and economic structure, but also erases the dialectal differences inherent in the nationality, creating a literary, common language for all, modernizes and strengthens the common mental make-up at a new level, thereby cementing the unity of the nationality with it, turning it into an absolute one ideological and political national value. At the same time, its geographic (state) boundaries are clearly defined.

Humanity today exists in the form of separate nations at different levels of political development, but having certain general ideas about the world, about the history of mankind, as well as about good and evil. However, this common understanding of some categories does not mean the unity of different nations.

Historical experience shows that the unity of a nation is best strengthened by the presence of enemies, primarily external ones. As a result, political ideology always denigrates the neighboring and other peoples, attributing to them the most negative customs and traditions, ridiculous or cruel national rituals, insidious intentions. It is clear that under such conditions, relations between nations are often tense, wary, threatening under certain conditions to turn into an armed confrontation.

Serious differences between nations are a reality faced not only by politicians, but also by educators. The underlying causes of these differences are objective and subjective.

Researchers attribute to objective reasons the territorial and landscape conditions for the existence of ethnic formations, including climate, flora and fauna, the nature of the soil, the reserves and nature of water, and more. This also includes economic conditions (division of labor and production of livelihoods).

The methods of distribution and consumption of the means of subsistence, on which the specificity of political and ideological relations within the community depends, together with the language, customs, ceremonies, rituals and results of creative activity in their totality are usually denoted by the term “culture”. Culture is the subjective aspect of the existence of ethnic education.

The concept of "culture" is a fundamental and most general concept in social science, so wide is the range of objects and phenomena included in it, as well as semantic shades. The diversity of the content of the concept of "culture" significantly complicates its scientific definition. This explains the large number of these definitions. Each definition covers only some part or feature of the culture. [2, p.13].

The variety of definitions of culture reflects the whole variety of human activity and the results of these activities. Each definition is only a fixation of one of the innumerable aspects of human activity. We are interested in the culture of an ethnic community, its features and significance.

The culture of an ethnic community is an integral set of components, the main of which are language, customs, traditions, ceremonies and rituals, behavioral

norms and folklore. Flexible interconnections and interpenetration of these components provide the ethnic culture with the possibility of self-preservation. And also the possibility of self-recovery, if for some reason a part of the ethnic culture is destroyed.

Over the centuries, the ethnos has been developing its own methods and techniques for transferring elements of its culture to new generations and consolidating them in children's and adolescent consciousness. In this process, ceremonies and rituals, which have been perfected over the centuries, take an important place.

First of all, this concerns such an important attribute of communication as language. The linguistic turns of each nation have developed such nuances that they easily convey both deep respect for the interlocutor and disregard for him. The language also describes the most important etiquette forms of behavior, rituals in terms of their beauty and tolerance, making them romantic and attractive for teenagers.

For example, among the Adygs had (and are now often observed) strict rules that determine the place of everyone in a group of people who go somewhere: where the oldest should be, where the next oldest should be, and so on up to the youngest. The stories behind this phenomenon were formulated in such a way that every person in the group, wherever he was, had a reason to be proud of his place and to be satisfied with it. It turned out that everyone took such a place that without him the unity and coherence of the group would be disrupted to such an extent that it would not be able to fulfill its task: whether it was a trip to spring plowing or a combat patrol. In the same way, references to the elders, even older ones, to the eldest and, conversely, to the younger ones, were defined.

Such ceremonial and ritual behavior and appeal to older and younger people acquired, in addition to some abstract and aesthetic form, a direct practical meaning, which is of great importance for the life of the entire ethnic group. A striking example is the sociological study of the 60s of the twentieth century, which was supposed to establish the reasons for longevity in Abkhazia.

In this study, the method of participatory observation was widely used, when "... sociologists lived for a long time in Abkhaz villages, studied the language, even married Abkhaz women, in order to become their own and delve into this secret from the inside. However, the truth, obtained with such difficulty, turned out to be useless, since it turned out that one of the most important components of longevity is the traditionally deep respect of the Abkhaz for the elderly, expressed not only verbally, but also ritual-behaviorally, all their support, admiration for them, and so on. The transfer of these qualities to another national environment turned out to be as impossible as it is impossible for a person to become a representative of another ethnic group. It turned out that in order to live long, one must be an Abkhaz and live among the Abkhaz”[3, p.9].

In addition, the landscape and climatic conditions of life are so important for the survival of the ethnos that a direct connection between them and national ceremonies and ritual actions is revealed in many details in certain events. For example, writers and military psychologists have long drawn attention to such an aspect of the human character as courage and the fact that it manifests itself differently in different nations.

So, it is considered long ago established that for the manifestation of courage of a German soldier, an exact order is required, given by a senior in rank, in compliance with all ceremonies. At the same time, too clear an order often fetters the manifestation of courage of the Italian soldier. A Frenchman is ready for heroic deeds if he is inspired by beautiful slogans: "The guard dies, but does not surrender" [7, p. 72]. The Spaniard is capable of miracles of courage in the presence of witnesses [5, p.174]. But Russian courage stands apart. L.N. Tolstoy, who described the feat of private captain Tushin in the battle of Borodino, emphasized that he, this hero, would be surprised to hear that he was performing a feat, that for him it was a simple fulfillment of his duty. The decisive role here was played by the sparsely populated wide Russian expanses, when often simple survival required a daily harsh feat in the complete absence of admiring spectators.

In this regard, we can recall another of the military rituals that were born and developed in detail in the West. Here, with the densely populated lands, the defeated had nowhere to go: they still had to stay in place and live there. Therefore, the rite of surrender of the fortress, city, lands was born: military and civil leaders solemnly appear to the winner at the time and place appointed by him, bring him their weapons as a sign of submission, hand him the "keys" from the city, fortress in recognition of his domination.

The situation was different in Russia, where wide open spaces provided room for maneuver, temporary retreat, even resettlement with the preparation of a new offensive. Napoleon, who came to Russia with Western performances, found himself in a strange situation on the Sparrow Hills near Moscow, when he was waiting for a long time for a representative Russian delegation, which would hand him the "keys" to Moscow. Napoleon Bonaparte could not imagine a people defeated in a decisive battle, surrendering the country's second most important city and, nevertheless, believing that a real war had not yet begun.

Many authors draw attention to the fact that peoples who are geographically close to each other often have similar ceremonies and rituals, as well as characters. This fact has been emphasized more than once in the literature. For example, one of the heroes - the Cossacks of the Kuban writer A. Perventsev, speaking at the gathering, says: "... For decades next to the Circassians. Does it mean anything? One wise guy assured me: the uniform was just adopted, for the convenience of riding. No, the form is the form, and most importantly, the custom was picked

up by the Circassians, this very free spirit, the pride of the mountain ”[4, p.102]. Another author, supporting this point of view, says that the Cossacks are closer to the highlanders than to the Russian Pomors, who, in turn, are closer according to the indicated characteristics to the neighboring non-Russian peoples, in particular, the Finns.

There are many facts when children of one ethnic group, for one reason or another, found themselves among another and brought up there, acquired ethnic characteristics of this second ethnic group. But as a second name, they retained the name of their native ethnic group. Hence, there are so many among the Adygs Kalmykovs, Kumykovs, Chechenovs, Urusovs, Nagoevs.

Thus, we can confidently assert that the ritual differences developed over the centuries, associated with moral, ethical and aesthetic primordial values, constitute the backbone of the existence of an ethnos. They are the most important, after language, a condition for self-awareness, self-identification of an ethnic group.

At the same time, the development of ethnic groups, their cooperation in different fields of activity, have a leveling or even overwhelming effect on their specific differences, ceremonies, traditions and rituals. The point of view that, as a result of such interaction, the differences between nations will be erased and humanity will become one, today does not cause serious objections to anyone. However, this event is sinking in such a distant prospect that it is recognized as expedient to respect the ritual and ritual traditions of the peoples. History has repeatedly taught the lessons that an attempt to forcibly transfer a people to foreign conditions of life, leads to its degradation and death, or generates a terrifying wave of violence. This is because the people are resisting such an impact with a rage bordering on self-destruction.

A careful attitude to this side of national specifics, its study, preservation and ensuring its transmission to new generations is a task worthy of a developed humanistic society.

A lot of serious work is being done in multinational Russia in this direction. A whole direction has been formed, which is called ethnic education and practical ethnopedagogy. Its synonyms are the terms “folk traditions of upbringing”, “folk upbringing”, “folk pedagogy”.

It seems that the efforts of scientists in this area should be focused on the systematization of the relationship "education - national culture" and "education-nature-man-ethnos" [6, p.129].

Education should be international, focused on the common values of economic, cultural and educational cooperation and the integration of the efforts of the regions in solving global and priority tasks of mankind as a whole. Education should develop the responsibility of the younger generation for the events taking place not only in the country, but throughout the world. At the same time, a

respectful attitude towards another culture, history, an understanding of the high responsibility for it should become integral parts of the modern consciousness of an educated person. Ethnic education is mainly the task of the school, but higher education institutions also fulfill this task.

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DOI 10.34660/INF.2021.93.27.013

EASTER FESTIVAL. STOP URAL CITY PERM

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Abstract. *The Moscow Easter Festival immediately won the love of the public and became one of the largest and most anticipated events in the cultural life of Russia. The largest music forum in Russia, which annually gathers tens of thousands of listeners, includes in its programs both masterpieces of classics and rarely sounding works performed by the best masters of our time, performers from around the world, including artists of world magnitude, and young talents: laureates of the International Tchaikovsky Competition, held once every four years in their native Fatherland. Moscow Easter Festival-2021 celebrated its 20th anniversary. Concerts of world-famous soloists and outstanding musical groups were held at the central concert venues of Moscow and the regions of Russia. With performances in hero cities and cities of military glory, festival participants paid tribute to the exploits of Russian soldiers during the Second World War. Maestro is one of the most authoritative musicians in the world, a titled conductor, he performs with the best orchestras in the world, and the Mariinsky Theater Orchestra is considered the most actively touring orchestra in the world! As the director of the Charity "Valery Gergiev Foundation" A.Kesaev noted, the concerts that took place earlier in Perm became bright events of the festival program, and we will be very happy to perform again on your hospitable land, sharing with the listeners the joy of the great Easter holiday.*

Keywords: *festival in Russian cities dedicated to Easter, symphony concert*

From the first days of its holding, its social priorities were determined - charity, education and enlightenment, which were implemented in programs: symphonic, chamber, choral (UKH under the direction of V.A. Novik, at the personal invitation of Valery Gergiev in early May in Moscow and Tver: on May 3, the Perm choir was entrusted with the honorary right to open the festival program in the

Cathedral of Christ the Savior) and the telephone (see: photo 1).



Photo 1. Gergiev and the renowned orchestra greet the Perm audience. BZPF

On the eve of his next birthday, the world conductor's star is back in Perm. (see: photo 2).

Dear Valery Abisalovich!

Let me wish you a happy birthday! The whole world knows you as an outstanding conductor, head of one of the leading musical theaters in the world, as an extraordinary, creative person who is passionate about what he loves. And we are happy that we also know you from this side and are ready to subscribe to each of these words! With your multifaceted, demanded activity, you enrich the national art, make a unique contribution to the preservation of the richest cultural and spiritual heritage of our country, to the development of the traditions of selfless devotion and charity. You are a person of not only multifaceted talent, but also incredible energy, creative search, constant movement. You give concerts in various cities and countries, conduct orchestras, light up new stars of performers, hold grandiose festivals. We are sincerely grateful to you for your cooperation, for the fact that for many years you have included Perm in a selected number of cities that are honored to host your Moscow Easter Festival! We wish you health, creative life, new professional successes, full halls and grateful listeners!

Director of the Perm Regional Philharmonic Society, Honored Worker of Culture
of the Russian Federation G. Kokoulina.
The Perm Regional Philharmonic Society



Photo 2. Greetings to the renowned team. BZPF

The regional philharmonic society again this time hosted on the hospitable Ural land the first-class performers of the world performing level: the violinist Pavel Milyukov, the pianist Daniil Trifonov.

The main characters of the last year, doctors, have become spectators of the daytime concert, thanks to whom it has now become possible to hold concerts. This concert is an expression of gratitude to the heroes of today: medical and social workers, volunteers and all those who continued to fight the coronavirus infection.

The program of the evening concert included works of the classical orchestral repertoire: C. Debussy prelude to the "Afternoon rest of a Faun" (1894); S. S. Prokofiev (1891-1953). Symphony № 5 in B major, Op. 100 (1944).

We will focus on just one frequently performed piece at concert venues, namely, Concerto for Piano and Orchestra № 3 in d-moll, Op. 30. S.V. Rachmaninov. Brilliant Gergiev Orchestra and pianist, "Grammy" winner¹ (see: photo3).

¹The most anticipated and loudest music award in the world. It is not for nothing that she was dubbed the "Musical Oscar" in the media sphere. Members of the National Academy of Arts and Recordings vote by secret ballot to select the winners. A small golden gramophone is awarded to the



Photo 3. Gergiev-Trifonov. BZPF

It is worth listening from the stage to their magnificent, hypnotic, understanding from a half-word union, representing the orchestral-pianistic standard of artistic performance. Understanding with each other through gestures. You listen, enjoy, enrich yourself with positive, emotionally, vibes that carry from them, and you think that no one can perform this hackneyed work better than the ideal, and this is true. Rachmaninoff is a symphonist and Rachmaninoff is a pianist. Rachmaninoff's symphonism competed with Rachmaninoff's pianism. Everything here turned out to be interconnected. This instrumental piece with the orchestra sounded as a whole, there was no traditional break between the parts, the music of the first movement flowed into the music of the second movement, and then into the third movement, and did not provide for applause between the parts, which usually interfere with the effect of classical music for medicinal purposes on human body. This is Hergiev's style of presenting works in several parts to listeners, which is quite logical. The performers are accustomed to this style of conductor, they are accustomed to adjusting to it, he does not regret them, does not allow them to rest, tune in to the next part, but presents a multi-part piece right away, as a single, monolithic organism, dictating their superiority, thereby showing on the stage who here is the boss, who is in charge here. He has complex gestures,

laureates. He is taken away from the ceremony not only by performers, but also by sound engineers, arrangers, composers, conductors - people who have achieved significant success in musical activity.

understandable only to orchestra members. It is not clear when the conductor gives overtacts, when he shows the intro to the entire orchestra or a specific group of instruments, when he is shooting, i.e. you constantly adjust to it. He also uses the fine technical motor skills of conducting. Only professionals who feel the orchestral ensemble, along with the full musical outline of the instrumental concert, play with him. With Gergiev, you need to show virtuoso skill with musicality. He only plays with outstanding musicians. Professional training of performers with the highest charisma (see: photo 4).



Photo 4. Trifonov execution. BZPF

You need to look at this and not only, you worry with him, you penetrate the whole drama of Rachmaninov's music, you watch him make climaxes, overlapping the powerful Mariinsky Orchestra of first-class musicians, like a piano instrument from under his pianistic fingers sounds magical he is all in music, soars in the media space, for him there is no stage, no audience, the pianist charismatically leads the audience into the world of Rachmaninov's states: emotions, feelings, experiences, violent passions. This can be done by a master of the world performing class, interpreter of classical music Daniil Trifonov (see: photo5). It is not for nothing that with his attractive performances (his schedule is scheduled for years to come) he constantly confirms that it is not for nothing that he was awarded the first prize (gold medal) in the category: pianists at the internationally rated International P.I. Tchaikovsky Competition (Moscow).



Photo 5. Daniil Trifonov enchants music lovers of classical music with the magic charms of Rachmaninoff's music. BZPF

Others did not pay attention, but we noticed that the pianist performed without a jacket, in a white shirt. It may be uncomfortable to perform in a concert costume, this is probably some kind of talisman that helps him in concert activities, in his musical career, I don't know, it's hard to say, but I often see him dressed in such a uniform in videos. And even when he came out, we saw his tall, but discordant hunchbacked figure. He behaved extremely, even too modestly on stage. Bowed shyly. This is encouraged. Modesty adorns a person, however, in our rapidly turbulent time, the saying has become outdated and has turned into another reading of it, insolence adorns a person (see: photo 6,7).



Photo 6. A triumphant performance by a world-class pianist. BZPF



Photo 7. The reference game of an outstanding performer. BZPF

As part of a working meeting between the Perm Region and the Mariinsky Theater, a 2-year cooperation agreement was signed before the concert part. The document envisages the implementation of joint projects, the organization of exchange tours of creative teams and performers of the Perm Territory and the Mariinsky Theater. In addition, joint innovative projects and theatrical performances are planned, the exchange of experience in all areas of activity in the field of musical art, the organization of internships, and master classes with the participation of leading figures of culture and art. Governor D. Makhonin told about his visit to the theater. "I saw the new stage, how everything is arranged from a technical point of view - this is a large and important project for the cultural life of the country. Since we are currently designing an opera stage, it is important for us to learn about the successful experience of others in order not to make mistakes, and we are grateful to the leadership of the Mariinsky Theater for advising and helping us. The acting stage of the Perm Opera and Ballet Theater was one of the houses of the Mariinsky Theater - during the Second World War, it was then called the theater named after S.M. Kirov and was evacuated to Perm. Many theatrical figures later remained in the Ural city, and their experience and talents, among other things, became the foundation for the creation of our ballet school. We are building a music school for gifted children, and we want them to have the opportunity to gain experience and learn from the great St. Petersburg cultural figures" - said the head of the region. "There is no such history of relationships, not even kinship, as in our theaters. And we simply have no right to forget this. We already have many plans, including great prospects for cooperation in the name of educating future generations of musicians. For example, the Diaghilev festival, which is not only your pride - we all owe a lot to him" - stressed V. Gergiev.

The maestro spent the whole day in Perm and then went to Moscow, where the festival movement dedicated to the Church Slavic holiday of Christ's Resurrection will continue. And we will wait for a new generation of young pianists-laureates of the III International Grand Piano Competition for young pianists (2021): Petra Akulova (Grand Prix); Nikolai Biryukov; Ekaterina Batyushkina; Sergey Davydchenko (Grand Prix); Barbara Kutuzova; Rui Ming; Anaita Stelmashova; Daniil Tyurin, as well as Elisei Mysin, laureate of the Vladimir Krainev Moscow International Piano Competition (2021). I would like to say a few words about the latter, he is a promising pianist (results of a music competition), a composer (author's piano cadenza for the 13th concert for piano and orchestra by W.A. Mozart), tours with symphony orchestras, a good orator (the ability to speak logically, build thought about myself, about music at the age of ten). Not everyone can express themselves freely. You listen to it and enjoy the talents given by God in various areas of music.

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AGE FEATURES OF CORRELATIONS BETWEEN OXYGEN SATURATION INDEX AND BLOOD TESTS IN BURN TOXEMIA

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Abstract. Oxygen therapy with almost continuous oxygen insufflation mainly through a nasal catheter during spontaneous breathing stabilized the oxygen saturation index at a level above 97% in all patients. Only in patients of subgroup 2, 7.1-18 years old, there was a direct dependence of oxygen saturation on the number of erythrocytes, hemoglobin level, hematocrit and platelets with a burn surface area of $55.1 \pm 14.4\%$, grade 3 B $4.8 \pm 3.5\%$, IF 86.3 ± 15.7 units. A high probability of a decrease in the oxygen saturation index (-0.76) was revealed with an increase in the concentration of glucose in the blood with the largest area of deep burn of 3B degree $9 \pm 2.8\%$ in infants. In the first 10 days of toxemia, the revealed inverse dependence of the oxygen saturation indicator on the increase in plasma osmolarity (the indicator of urea, creatinine, glucose) was due to the introduction of hypertonic glucose solutions as part of parenteral nutrition in conditions of pronounced hypermetabolism. A negative effect of an increase in plasma fibrinogen on the oxygen saturation index was revealed in subgroup 2

of group 1 (up to 3 years), in 2 and 3 subgroups of group 2 (3.1-18 years) and a moderate trend in group 4 (19-40 years).

Keywords: *oxygen saturation, burn toxemia, correlations.*

Relevance

The acute period of burn disease (the first 8-9 days) accounts for 72% of the total mortality from burns, and this fact alone convincingly confirms the exceptional importance of understanding the complex chain of general and local changes in the body for the use of pathogenetically based treatment. During the period of acute burn toxemia and septicotoxemia, there is a decrease in the saturation of hemoglobin with oxygen, pO₂ in arterial blood, a decrease in hemoglobin and volumetric oxygen content in the blood. The shift of the oxyhemoglobin dissociation curve to the right is maintained. In these stages, metabolic alkalosis with hypokalemia is noted. In cases of complications of burn disease by exhaustion, dystrophy of internal organs, pneumonia, sepsis, arterial hypoxemia, metabolic alkalosis and hypokalemia are aggravated [1-4]. Due to the lack of information on a differentiated assessment of the features of the effect of burn toxemia on changes in the homeostasis system at different age periods, we considered it necessary to study the data of monitoring the oxygen saturation index, clinical and biochemical parameters of blood, to determine the relationship with the systemic inflammatory response in order to increase the effectiveness of treatment, to optimize the prognosis.

Purpose

To study and assess the correlations between the oxygen saturation index and blood tests in burn toxemia, depending on age.

Material and research methods

The results of monitoring the oxygen saturation index of patients admitted to the Department of Combustiology of the Republican Scientific Center of Emergency Medicine due to severe burn injury were studied. After recovery from shock, anti-inflammatory, antibacterial, infusion therapy, correction of protein and water-electrolyte balance disorders, early surgical, delayed necrectomy, additional parenteral nutrition, syndromic, symptomatic therapy were carried out. Changes in the circadian rhythm of oxygen saturation were studied by hourly continuous recording of hemodynamic parameters in 107 patients with severe thermal burns in six age groups - group 1, 31 patients aged 6 months - 3 years, group 2 - 25 patients aged 3.1-7 years, 3 group of 25 patients - 7.1-18 years old, 4 - 12 patients 19-40 years old, 5 - 7 patients 41-60 years old, group 6 - 7 patients 61-78 years old. The division into groups was dictated by the well-known features inherent in each age group, described in detail in the literature. Hemodynamic indices in each pediatric group were differentially studied in three subgroups, depending on the severity

of the burn injury according to the duration of intensive care in the ICU. Children were in the ICU from 4 to 10 days - 1 subgroup, 2 subgroup from 11 to 20 days, 3 subgroup from 21 to 50 days.

Table 1.
Patient characteristics

Subgroups	Groups	Age	Burn area of 2-3A degree in%	3 B degree	IF, units	Days in the ICU
1	Group 1	19.3±6.2 months	32.7±9.8	0.1±0.03	33.4±10.1	6.8±1.8
2		14.2±4.6 months	24.8±7.4	9±2.8	48.4±11.28	12.8±1.3
3		10.1±2.1 months	26.7±2.2	6±2.7	71.3±8.4	26.3±2.4
1	Group 2	4.7±0.8	37.3±14.7	3.1±4.4	42.5±15.7	8.1±1.3
2		4.0±0.1	47.9±17.1	18.1±12.2	85.1±28.7	13.1±1.9
3		4.4±0.6	59.2±12.2	36.7±13.3	127.5±33.3	27.3±3.2
1	Group 3	11.4±3.2	41±11	6.6±6	57±11	7.3±1.1
2		15±2	55.1±14.4	4.8±3.5	86.3±15.7	12.7±1.1
3		9.7±1.5	25.8±11.4	22.5±6.6	95.8±19.1	28.8±4.8
	Group 4	27.3±5.6	59.4±13.5	21.3±13.3	119.4±38.4	22.4±14.6
	Group 5	50.7±7.1	54.3±16.5	11.9±8.9	92.5±20.8	13.3±2.4
	Group 6	71.3±7.0	40.8±5.8	21.7±6.7	86.7±12.8	18.8±9.5

As shown in tab. 1, the main factors influencing the severity of the condition of children with thermal burns of infancy were age (the younger the child, the more severe the condition), the area of damage to the skin surface of 3B degree, and the IF index.

The average age of children with severe burns in the age group from 3.1 to 7 years (group 2) ranged from 3.9 to 5 years (tab. 1). There were no significant differences between the groups and in the index of the area of the 2-3A burn, and amounted to $37.3 \pm 14.7\%$ in 1 subgroup, $47.9 \pm 17.1\%$ in 2, and 59.2 ± 12 in 3.2%. However, a statistically significant difference was found in the area of 3B degree burns in subgroups 1 and 3, which in the most severe group of children exceeded the 3B degree burn in group 1 by 11 times ($p < 0.05$) and was 6 times greater than in subgroup 2. In accordance with the severity of the condition, the duration of intensive therapy in ICU conditions in subgroup 2 was more than in the first by 62% ($p < 0.05$), in subgroup 3 more than three times longer ($p < 0.05$) than in the first. The determining the duration of treatment in the hospital in groups 1, 2 and 3 were such indicators as the size of the burn area of the 3B degree, the Frank index, the duration of intensive care in the ICU. Thus, age, IF index, and the area of 3B degree thermal damage served as objective indicators of the severity of

thermal burns and made it possible to predict the duration of intensive care in the ICU and inpatient treatment of pediatric patients.

As can be seen from Table 1, the age groups of adult patients were significantly different and the mean values were 27.3 ± 5.6 years in group 1, 50.7 ± 7.1 years in the second, and 71.3 ± 7 in the third. 0 years old. The total area and the area of deep burn damage to the skin did not differ significantly. The highest IF index was revealed in group 1, which determined the longest duration of intensive therapy in ICU conditions in group 4.

Results and its discussion

As can be seen from the data presented in Table 2, no significant deviations in the mesor of the circadian rhythm of the oxygen saturation indicator were found both on the first day and during the first 10 days of the toxemia period.

Table 2
Dynamics of the mesor of the circadian rhythm of the oxygen saturation indicator during the period of toxemia, depending on age

	Group 1			Group 2			Group 3			Group 4	Group 5	Group 6
	6 months-3 years			from 3.1-7 years			7.1-18 years			19-40 years	41-60 years	61-78 years
Days	Subgroup 1	Subgroup 2	Subgroup 3	Subgroup 1	Subgroup 2	Subgroup 3	Subgroup 1	Subgroup 2	Subgroup 3	Group 4	Group 5	Group 6
1	98.0 ±0.1	97.7 ±0.3	97.0 ±0.6	97.9 ±0.3	97.8 ±0.3	97.6 ±0.3	97.6 ±0.3	98.3 ±0.3	97.8 ±0.7	97.8 ±0.2	97.4 ±0.4	97.6 ±1.0
2	97.9 ±0.1	97.9 ±0.2	97.2 ±0.3	97.9 ±0.1	98.0 ±0.3	97.7 ±0.3	97.8 ±0.2	98.1 ±0.3	97.2 ±0.4	97.4 ±0.1	97.3 ±0.4	97.2 ±0.3
3	97.7 ±0.4	97.7 ±0.3	97.8 ±0.3	98.0 ±0.2	97.8 ±0.5	98.1 ±0.3	98.0 ±0.2	98.0 ±0.2	98.0 ±0.2	97.7 ±0.2	97.4 ±0.2	97.6 ±0.2
4	97.9 ±0.1	98.0 ±0.2	97.7 ±0.3	98.1 ±0.2	98.1 ±0.2	98.2 ±0.2	98.0 ±0.2	98.2 ±0.3	97.5 ±0.3	97.8 ±0.2	97.4 ±0.3	97.2 ±0.3
5	98.0 ±0.2	98.1 ±0.2	97.7 ±0.3	97.8 ±0.1	97.4 ±0.3	97.7 ±0.2	97.7 ±0.1	97.9 ±0.2	97.4 ±0.4	98.0 ±0.2	97.6 ±0.2	96.8 ±0.7
6	97.9 ±0.2	97.5 ±0.3	97.6 ±0.3	98.2 ±0.2	98.1 ±0.2	97.9 ±0.2	97.9 ±0.2	98.0 ±0.3	98.2 ±0.2	98.0 ±0.2	97.7 ±0.2	97.4 ±0.3

7	98.1 ±0.2	97.7 ±0.2	97.9 ±0.3	97.5 ±0.3	97.9 ±0.2	98.0 ±0.2	97.8 ±0.3	97.8 ±0.3	97.9 ±0.4	97.7 ±0.2	97.5 ±0.3	97.2 ±0.3
8	97.7 ±0.2	97.9 ±0.3	97.7 ±0.3	97.8 ±0.2	98.1 ±0.2	98.2 ±0.2	97.6 ±0.4	97.6 ±0.2	97.8 ±0.3	98.1 ±0.2	97.8 ±0.3	97.5 ±0.2
9	97.9 ±0.3	97.8 ±0.2	97.9 ±0.3	98.2 ±0.3	97.8 ±0.3	98.0 ±0.2	99.0 ±0.5	97.3 ±0.3	97.8 ±0.2	97.7 ±0.2	98.0 ±0.1	97.1 ±0.5
10	97.9 ±0.1	98.0 ±0.2	97.4 ±0.4		97.8 ±0.2	98.1 ±0.2		97.4 ±0.3	98.0 ±0.2	97.9 ±0.3	97.9 ±0.3	96.8 ±0.5

Oxygen therapy with almost continuous oxygen insufflation mainly through a nasal catheter during spontaneous breathing stabilized the oxygen saturation index at a level above 97% in all patients.

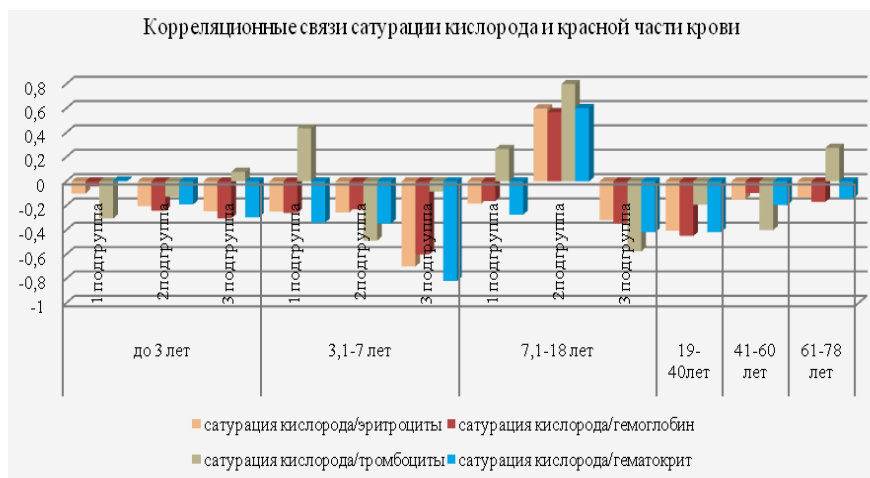


Fig.1

Direct correlation between the dynamics of the mesor of the circadian rhythm of the oxygen saturation indicator was revealed only in patients of the 2nd subgroup of the 3rd group, which amounted to 0.6 oxygen saturation with erythrocytes, hemoglobin, platelet count 0.9, hematocrit index 0.6, which indicates a direct dependence of the studied indicator on the number of erythrocytes, the level of hemoglobin, hematocrit and platelets with a burn surface area of $55.1 \pm 14.4\%$, 3B degree $4.8 \pm 3.5\%$, IF 86.3 ± 15.7 units. Moderate negative correlation with more severe burns with an area of $25.8 \pm 11.4\%$, with the depth of the surface lesion of 3B degree of $22.5 \pm 6.6\%$, IF 95.8 ± 19.1 units in subgroup 3 of group 3,

suggests that that an increase in the area of deep 3B degree damage and an increase in IF are factors that violate the direct correlation dependence of oxygen saturation on the number of erythrocytes, platelets, hemoglobin and hematocrit. That is, blood transfusion in children of the 3rd subgroup of the 3rd group will not cause the desired increase in the oxygen saturation index and even there is a possibility of a tendency for a decrease in oxygen saturation with an increase in the number of erythrocytes, platelets, hemoglobin, and hematocrit in the blood. The same tendency of the negative effect of blood transfusion on the amount of oxyhemoglobin in the blood was revealed in the first 10 days of burn toxemia in children of the 3rd subgroup under the age of 3.1-7 years and less pronounced in adults.

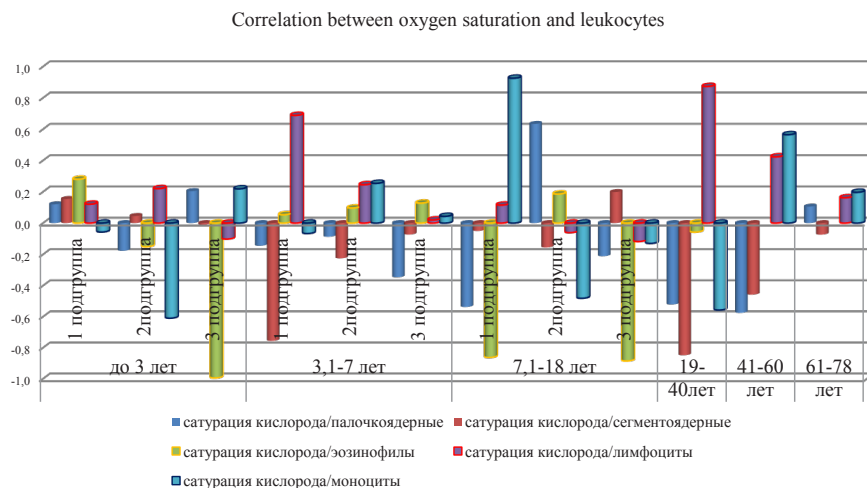


Fig.2

A strong direct correlation was found between the dynamics of monocytes and oxygen saturation in subgroup 1 of group 3, that is, with the area of the burned surface of the skin $37.3 \pm 14.7\%$, 3B degree $3.1 \pm 4.4\%$, IF 42.5 ± 15.7 units an increase in the number of monocytes with an increase in blood oxygenation can be interpreted as a feature of the inflammatory reaction of children of this age, when an increase in blood oxygenation increases the tendency to monocytosis with a relatively small area of 3B degree of skin lesion.

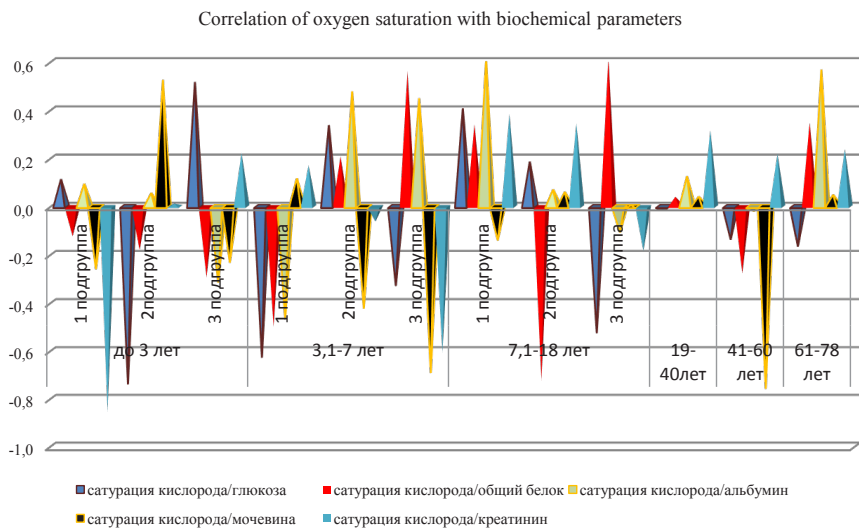


Fig.3

The feedback of oxygen saturation and glucose concentration in the blood (fig. 3) was revealed in subgroup 2 of group 1, which characterized a high probability of a decrease in the oxygen saturation index (-0.76) with an increase in blood glucose concentration with the largest area of deep burn 3B degree $9 \pm 2.8\%$ in infants. In order to correct the energy deficit state, all burned patients received parenteral nutrition in addition to the enteral administration of amino acids + reimbursement of the calorie requirement in the first days of toxemia with concentrated glucose solutions and later with fat emulsions. Probably in conditions of severe intoxication due to deeper destruction of the skin surface, high-osmolar solutions contributed to the difficulty of oxygen diffusion, which was manifested by the inverse relationship of the oxygen saturation index on the increase in plasma osmolarity by the introduction of hypertonic glucose solutions. The same tendency was revealed in patients of the 1st and 3rd subgroups of the second group, in the 3rd subgroup of the 3rd group. Confirmation of the effect of changes in the physical properties of plasma (increased oncotic pressure) on oxygen saturation is the inverse correlation between the protein concentration in the blood and the oxygen saturation index in the 2nd subgroup of children of the 3rd group in the burn area $55.1 \pm 14.4\%$, 3B degree $4.8 \pm 3.5\%$, IF 86.3 ± 15.7 units (fig. 3) Negative correlation between oxygen saturation and concentration in subgroup 1 of group 1, as well as a significant trend in the feedback of indicators in subgroup 3 of group 2, can also be explained by negative the influence on oxygenation at the level of

the alveoli of changes in the concentration of creatinine in subgroup 1 of group 1 (-0.83), in subgroup 3 of group 2 (-0.61). The same direction of the influence of an increase in plasma osmolarity on blood oxygenation (-0.7) was found in children of the 3rd subgroup of the 2nd group with the most severe burns in this age group with an area of $59.2 \pm 12.2\%$, 3B degree $36.7 \pm 13.3\%$, IF 127.5 ± 33.3 units That is, excessive catabolism with more extensive and deep burns, causing an increase in metabolic products (urea and creatinine), significantly inhibited the process of hemoglobin oxygenation at the level of the pulmonary parenchyma.

Correlation relationships between oxygen saturation and enzymes, blood electrolytes

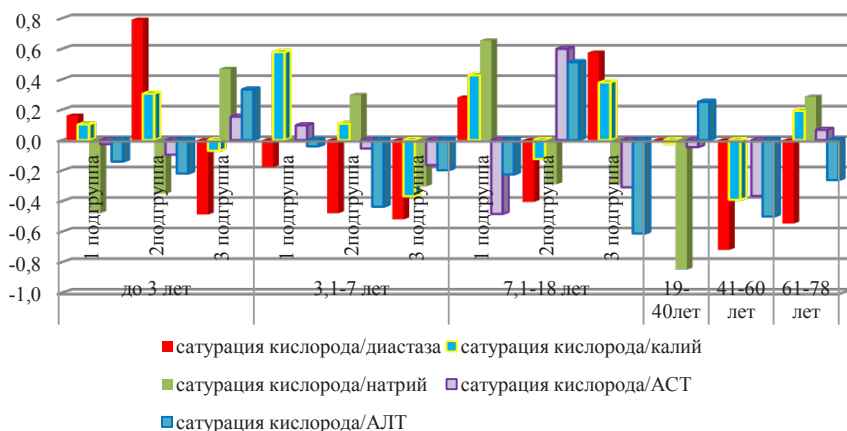


Fig.4

The greatest effect of diastase on oxygen saturation (Fig. 4) was observed in children of subgroup 2 of group 1 (0.78). The negative effect of an increase in the concentration of sodium in the blood on the oxygen saturation index was revealed in patients of group 4 (19-40 years old).

Correlations between oxygen saturation and the coagulation system

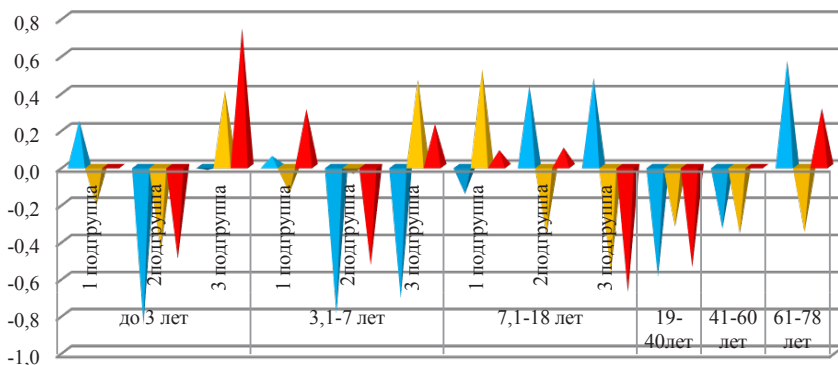


Fig.5

A negative effect of an increase in plasma fibrinogen (hypercoagulation in phase 3) on the oxygen saturation index in subgroup 2 of group 1, in 2 and 3 subgroups of group 2 and a moderate trend in group 4 was revealed, which characterized the negative effect of hypercoagulation in 3 phase on the process of blood oxygenation (fig. 5). The increase in the direct correlation between PI (coagulation in phase 2 of coagulation) and oxygen saturation (0.69) in subgroup 3 of group 1 was due to the negative effect of liver dysfunction in toxic hepatitis on the process of blood oxygenation in the most severely burned infants.

In the first decade of burn toxemia, a decrease in leukocytosis increased the oxygen saturation index of AO 2 in subgroup 1 of group (-0.72), in subgroup 1 of group 2 (-0.76) (Fig. 6). In the 1st subgroup of children of the 3rd group, the revealed direct correlation (ESR) of the erythrocyte sedimentation rate, apparently with the participation of additional compensatory mechanisms, increases oxygen saturation (0.8), and in the 2nd subgroup of the 3rd group, a decrease in ESR (-0.78).

Correlation between oxygen saturation and leukocytes and ESR

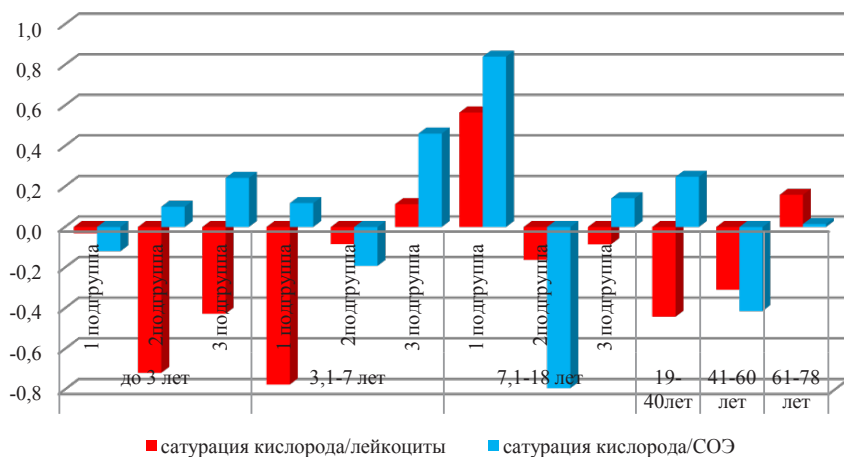


Fig.6

Conclusions. Oxygen therapy with oxygen insufflation through a nasal catheter during spontaneous breathing stably maintained oxygen saturation at a level above 97% in all patients. Only in patients of subgroup 2 of group 3 was there a direct dependence of oxygen saturation on the number of erythrocytes, hemoglobin level, hematocrit and platelets with a burn surface area of $55.1 \pm 14.4\%$, grade 3 B $4.8 \pm 3.5\%$, IF $86, 3 \pm 15.7$ units. A high probability of a decrease in the oxygen saturation index (-0.76) was revealed with an increase in the concentration of glucose in the blood with the largest area of deep burn 3B degree $9 \pm 2.8\%$ in infants. In conditions of severe intoxication due to deeper destruction of the skin surface, an increase in osmolarity and oncotic pressure of plasma contributed to the difficulty of oxygen diffusion in the alveolocapillary membrane, which was manifested by an inverse relationship between the oxygen saturation index and plasma osmolarity when hypertonic glucose solutions were administered. A negative effect of an increase in plasma fibrinogen on the oxygen saturation index was revealed in subgroup 2 of group 1, in 2 and 3 subgroups of group 2 and a moderate trend in group 4.

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DOI 10.34660/INF.2021.84.98.015

**STAGES OF CORRECTION AND REHABILITATION OF PATIENTS
WITH DENTAL-MAXILLOFACIAL DEFECTS AND
DEFORMITIES**

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Abstract.

Objects: To increase the efficiency of combined surgical and orthodontic treatment and rehabilitation of maxillofacial deformities. **Materials and methods:** We observed 352 patients (213 women and 139 men) aged 16 to 45 years, who were divided into 2 main groups with dentoalveolar defects and deformities. **Results:** Using our innovative techniques of treatment: installation of a cortical plate in the base of the nose, using of the chin implant, chin osteotomy, and other methods, increased the wanted results of treatment. **Conclusion:** Thus, in order to

achieve the desired result it should always be combined with surgical, orthodontic, psychological treatment with postoperative rehabilitation.

Keywords: *Dental maxillofacial deformities, surgical and orthodontic treatment.*

Introduction

Correction of dental-maxillofacial deformity [1] is a complex medical problem that carried out using the methods of anthropometric and computer modeling of the patient's facial reconstruction [2], to achieve optimal functional and desired aesthetic results based on the use of modern methods of osteotomy [3], of the facial section of the skull and the choice of rational methods of fixing the resulting bone fragments, ensuring their fusion and excluding the likelihood of relapse, TMJ dysfunction and other complications.

The significance of this problem is the prevalence of dental-maxillofacial and skeletal deformities of maxillofacial region, reaching among the population, according to various authors, 27-41% of their total number [4-6]. According to the studies of many authors and our observation, the mental deviations that have developed in this regard are reversible, and psychological rehabilitation of this group of patients invariably occurs when the anomaly is corrected. Another important task is to achieve optimal functional results, i.e. correction of dental arches, restoration of occlusion, and prevention of the development of complications such as dysfunctions, impaired innervation, and circulatory disorders of tissues in the area of surgery are necessary. Patients themselves carry out assessment of the achieved aesthetic results prior to operation (**Fig. 1 a, b**). If they are satisfied with their appearance after the operation, the result can be considered good [7-10].

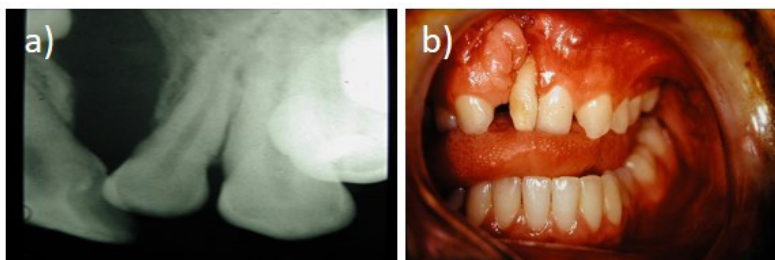


Figure 1. *a) Dental X-ray showing alveolar process bone defect of the upper jaw before operation; b) The patient's bite before the operation*

Purpose of the study – to increase the efficiency of treatment in patients with defects and deformities of the jaws through the use of innovative methods of planning orthodontic and surgical treatment, as well as rehabilitation, ensuring the achievement of aesthetic and functional results.

Materials and methods

For the period from 2014 to 2020 years we observed 352 patients (213 women and 139 men) aged from 6 to 45 years. In this work, patients classified according to the nature of diagnosed dentoalveolar defect and deformity. All patients divided into 4 groups, depending on the diagnosis and method of treatment. In reconstructive operations of dentoalveolar anomalies and deformities, preoperative orthodontic treatment contributes to the achievement of the treatment effect. According to the literature data, the need for orthodontic treatment varies within 85% of people with dentoalveolar anomalies and deformities. Of all patients, only 21 (5.6%) did not require preliminary correction of dental arches and underwent reconstruction of the lower jaw in the chin area for aesthetic reasons. In 331 patients examined by us (94.4%), preoperative orthodontic preparation was required, depending on the diagnosis. In the first group of patients with a congenital cleft of the alveolar process of the upper jaw, 90 people. Auto-bone grafting was carried out according to our technique. After orthodontic preparation, we performed auto-bone grafting using an improved method. Operation course: At the first stage, donor material was taken from the anterior 1/3 of the iliac crest. The second stage of surgical treatment began with the reconstruction of the bottom of the nasal cavity, preparation of the recipient bed for the bone graft (**Fig. 2a, b**). A mucoperiosteal flap was cut out to cover the graft from the vestibular side. This flap included a keratinized mucous membrane, which moved to the apex of the formed alveolar ridge. After the reconstruction of the nasal fundus, an insulating plate was made from the cortical layer of the taken bone, which was installed on the base of the nose, (**Fig. 4**) to isolate the nasal cavity and the anterior 1/3 of the hard palate, they proceeded to place the taken free bone fragment directly into the alveolar defect (**Fig. 3a, b**).

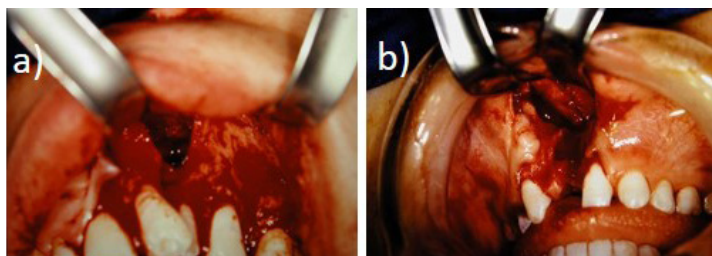
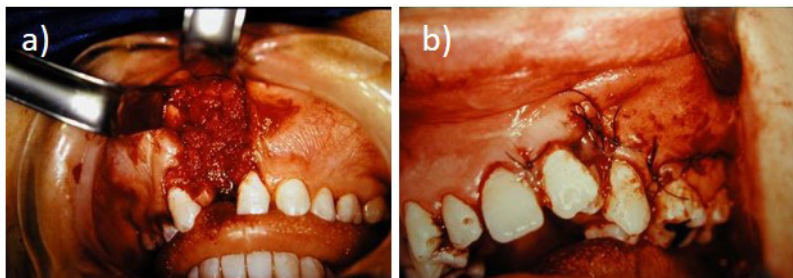


Figure 2. a) After detachment of the mucoperiosteal flap; b) After formation of back wall

The bone autograft was softened using special instruments and adjusted to the shape and size of the defect in such a way that it would enter it with some effort fixed inside defect; after which the final stage of operation started where the graft

was covered with a vestibular mucoperiosteal flap and the wound was sutured (Fig. 4a, b). Bone regeneration in patient teeth after surgery and complete bone formation with no cavity observed in space between teeth (Fig. 5 a, b).



*Figure 4. a) After fixing the spongy bone layer;
b) After suturing the mucoperiosteal flap*

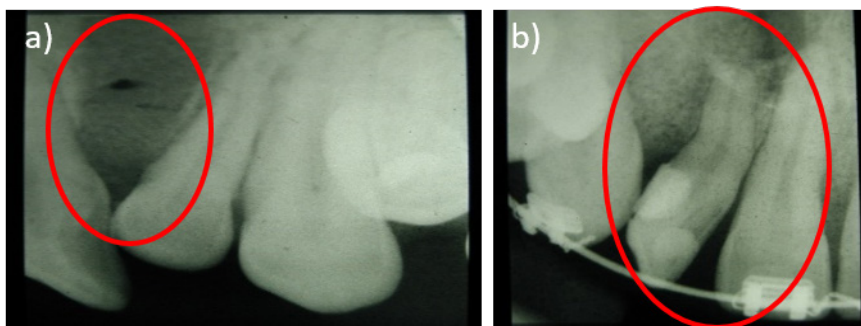


Figure 5. a) Bone regeneration in the same patients teeth after surgery 3 months later shown in red oval, X-ray photograph; b) Complete bone formation with no cavity observed in space between teeth shown in red oval, X-ray photograph taken after surgery 6 months later

In group II patients with inferior prognosis were 75 people, 55 of which received treatment according to our method. The method is carried out as follows, after the appropriate treatment of the oral cavity, infiltration and conduction anesthesia is performed, an incision is made along the transitional fold from tooth 33 to tooth 43, we peel off the mucoperiosteal flap, we expose the chin section of the lower jaw, we install a chin implant with fixation with 4 screws. Then the mucoperiosteal flap is put in place and interrupted sutures are applied. After suturing, the hook of the chin implant protrudes above the mucous membrane in 2 places

in the mental area. One end of the rubber rods fixed on hooks, the other end of the rubber rods is fixed on the previously installed hook of 6 teeth of the upper jaw (**Fig 6a-c**). Clinical and additional research methods were carried out: production of diagnostic models of the jaws, X-ray, cephalometric analysis, 3D computed tomography, echo osteometry, anthropometric measurements, and photographic research methods.

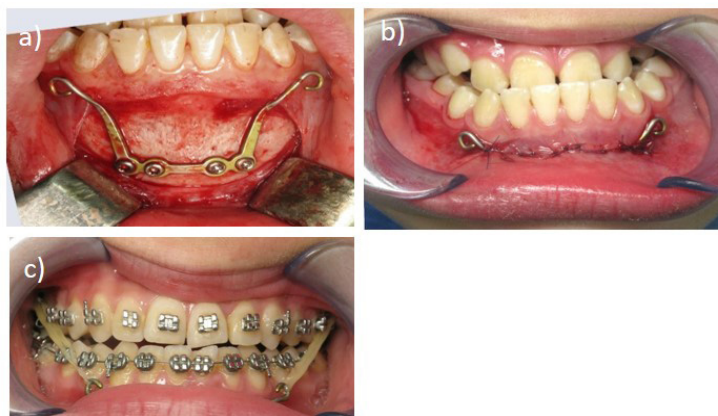


Figure 6. a) Chin implant placed on the lower jaw; b) Apparatus in the oral cavity after suturing the mucoperiosteal flap; c) Installed chin implant in action

Results and discussion

In the 1st group of patients were 90 people with a congenital cleft of the alveolar process of the upper jaw, who had auto-bone grafting surgeries were carried out according to our technique (Patent KR No. 2062) [11]. According to the results of our research, we can say that in the defects of the alveolar ridge, the use of our modified method improves the outcome of the surgical treatment, due to the installed cortical plate in the base of the nose and preventing microflora from entering the nasal cavity. The effectiveness of the treatment is also confirmed by the results of clinical, radiological, and densimetric studies, and when using the modified method, the defects were restored 1.5 times faster than the traditional method. Mixing the collapan gel with a bone transplant made it possible to improve the resistance to opportunistic flora because of its antibacterial action.

In the 2nd group of patients (75 people) with lower prognathous, 55 of them were treated by our method (Patent KR No. 2180) [12]. We have treated 75 patients with mesial occlusion (Angle class III anomaly), including 49 women and 26 men, where the numbers of female patients were 1.8 times more than male. The results of the study show that already on the 3rd month of treatment, the effect of

the use of the chin implant affects the changes in cephalometric parameters. On average, over 3 months of treatment, the main sagittal angles of cephalometry changed by ± 0.430 . In patients in the age groups of 12-15 years old and 16-18 years old, the indices of impaired occlusion are more pronounced, compared with the age group 19-21 years old. It has been proven that the use of both a chin implant and a chin sling is more effective during the period of skeletal growth. During this period, the growth of the lower jaw was more easily delayed compared to older patients. Consequently, if the patient is in the higher age, the less effective treatment methods of III class occlusion according to Angle. According to the results of the cephalometric analysis for 3 months of treatment of patients of the main group, depending on age, it can be seen that the average value of the SNA angle increased to 79.5 ± 3.30 , while significant changes were in the age categories of 12-15 years and 16-18 years. In the age group 19-21 years old, no particularly significant changes were observed. Thus, according to the results of the 3rd month of treatment, the protraction of the upper jaw in patients aged 19-21 years in the main group is significantly less than in patients in the age group of 12-15 years old and slightly lower than in the age group of 16-18 years old.

In the sagittal plane of the main group with the use of a chin implant and the comparative group with the use of a chain sling, there was a change in the SNA, SNB angles to the normal values (**Table 1**). Along with this, the delay in the vertical growth of the lower jaw in the main group had a significant difference in comparison with the patients in the other group. In the main group, AR-GO-ME, N-GO-ME indicators significantly decreased concerning the compared group, which indicated a delay in the growth of the lower jaw and transformation of the type of growth. Therefore, tendency for growth of the lower jaw is significantly lower in patients with a chin implant than in patients wearing a chin sling. The molar ratio in the main group improved on average by 1.4 mm, a significant difference in proclining of the lower incisors up to 2.4° compared to the patients of the compared group.

Table 1. Distribution of the main indicators characterizing bites depending on the age.

Indicators \ Age	12-15 y.o	16-18 y.o	19-21 y.o
SNA	80.5 ± 3.3^0	78.9 ± 3.3^0	77.0 ± 3.3^0
SNB	82.3 ± 3.3^0	83.2 ± 3.3^0	80.2 ± 3.3^0
ANB	9.4 ± 3.8^0	8.3 ± 3.8^0	7.2 ± 3.8^0
Ar-Go-Me	135.9 ± 6.3^0	133.5 ± 6.3^0	133.2 ± 6.3^0

In the issue, in the subsequent 6 and 9 months of follow-up examination and analysis of cephalometric parameters, diagnostic models, the changes proceeded with the same stable intensity, and in patients aged 12-15 years, the changes were much faster. This fact, in turn, proves that the use of orthodontic methods for treating anomalies of the dentition at the age of an early permanent dentition is more effective in comparison.

A mandatory point in the study was the complexity of the use of devices for the rapid expansion of the upper jaw in conjunction with the chin implant and the sling, due to this, in patients with underdevelopment of the upper jaw, where the devices for the rapid expansion of the upper jaw were additionally used, the protraction of the upper jaw in the late period of the mixed bite was much higher. Then in patients with permanent occlusion. The average difference in the protraction of the upper jaw in the 3rd month of treatment in the main group was 1.2-2.4 mm, and the indicators of the number of VITS in the main group were 0.5-1.2 mm more. Thus, according to the results of this study, there is a reliable efficacy of the use of a chin implant in comparison with a sling, which often patients simply refused to wear due to aesthetic discomfort.

In group III, 83 patients (48 women, 35 men) with distal occlusion and dystopia of the anterior teeth, grade II according to angle, did not require surgical intervention on the lower jaw. The upper jaw was expanded using the RPE apparatus (which is attached directly to the bone of the upper jaw with pins (mini-implants) on both sides), then, after the necessary expansion, the dentition was leveled with braces. In group IV were 104 patients, depending on the area in which the surgical intervention performed, using various osteotomy methods. 42 patients aged 17 to 31 years had a surgical correction of the lower prognathous with intervention on both branches of the mandible. All patients underwent retromolar sagittal osteotomy of the branches of the lower jaw with complete detachment of muscles around the branch. Analyzing the results of the surgical treatment of the group of patients under discussion, it can be concluded that the achievement of optimal functional and aesthetic results in patients with lower progression as well as the underdevelopment of the lower jaw can be achieved if the following indications are observed: if the sagittal gap does not exceed 1.0 cm and there is no displacement of the central incisal line, then it is necessary to carry out a retromolar sagittal osteotomy with complete detachment of the muscles around the ramus of the lower jaw, while good results are achieved.

Number of patients with upper prognathous were 21 (12 women, 9 men) aged from 17 to 31 years, had a surgical treatment according to the sagittal gap between the dentition, operation of which was carried out in the amount of fragmentary osteotomy in the anterior part of the upper jaw and high horizontal osteotomy of the upper jaw. The given clinical observation fully reflects the general results of

using the technique developed by us: fragmentary osteotomy of the upper jaw and high horizontal osteotomy of the upper jaw, which, subject to the indications, ensures restoration of the bite of patients while maintaining their appearance. In all examined patients, we did not observe the development of any complications in the postoperative period or recurrence of the corrected deformity.

The surgery of lower prognathous with simultaneous osteotomy in the chin area was performed in 30 patients for aesthetic reasons. Therefore, our clinical examples show that the intervention in the chin area to correct the lower prognathous, the restoration of occlusion in the group of patients under discussion occurs according to the methods of retromolar sagittal osteotomy of the mandibular branches and horizontal osteotomy of the chin area are due only to aesthetic indications.

Finally, treatment of the lower prognathous in the amount of osteotomy of the mandibular branch normalizes the bite but does not provide the desired aesthetic effect. This goal, following the wishes of the patient, was achieved by "additional" intervention in the chin of the lower jaw. To achieve a successful result of the intervention, it is crucial to consolidate the results of orthodontic treatment in the preoperative period. The determination of the optimal time for starting orthodontic treatment in the postoperative period is equally important. Determining the optimal timing of the start of orthodontic treatment in the postoperative period reduces the risk of complications, especially relapse.

The division into groups according to the nature of defects and deformities of the jaws and the individual approach of each patient allowed us to normalize the bite after the operation and obtain an appearance that satisfied the patient.

In the postoperative period, children with a congenital defect and deformity of the jaws need carefully organized care and long-term rehabilitation, as well as step-by-step treatment with the participation of a maxillofacial surgeon, orthodontist, otorhinolaryngologist, speech therapist, a methodologist in therapeutic gymnastics, and also a psychologist.

Based on maxillofacial surgery, a rehabilitation center for children with congenital defects and deformities of the maxillofacial region has been created. Patients are registered in the special software ONYX CEPH3 from 01/01/2015 to the present, where we enter detailed information about patients with the above pathology (name, date of birth, place of residence, contact numbers, diagnoses and treatment plans, photo of phases and profile, oral cavity before and after surgery). The purpose of this process is to closely monitor the general condition of patients, clinical examination, and rehabilitation.

Conclusion

Postoperative rehabilitation of patients is an important link in the context of ongoing treatment and largely determines the outcome of surgical correction of

the dentoalveolar deformity. The postoperative period consists of three main stages: intermaxillary immobilization, functional load on the dental-jaw apparatus, during this period electro-vibration massage (Patent KR 134) [13] used according to our method, as well as orthodontic and orthopedic treatment. The continuity and consistency of the implementation of these stages determine the degree of likelihood of a complication, the possibility of a relapse, and, ultimately, the achievement of the optimal result of a planned and performed surgical intervention with the restoration of the anatomical and functional state and aesthetic appearance of the patient.

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DOI 10.34660/INF.2021.81.62.016

PRECANCER AND VULVAR CANCER IN YOUNG WOMEN. ARE THERE ANY FEATURES?

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Abstract.

Purpose of the study: features of the clinical course of precancer and early cancer of the vulva in women of reproductive age.

Materials and methods: During the period from 2011 to 2014, 110 patients with dystrophic diseases, precancer and initial cancer of the vulva were examined at the gynecological department of Herzen NMRRC. The age of patients in the study ranged from 18 to 70 years (36 ± 3.5). Two main groups were identified: 1st - pre- and postmenopausal age (from 49 to 70 years) -60 people, 2nd - reproductive age (from 18 to 49 years old) -50 women.

Results. In the study of vulvar biopsies, patients with a diagnosis of stage I A vulvar cancer (27%) prevailed in group 1 compared with VIN (vulvar intraepithelial neoplasia) (13%). In group 2, the VIN diagnosis (28%) prevailed in comparison with the invasive tumor process (12%) and was asymptomatic in more than 50% of cases.

Conclusion. In women of reproductive age, vulvar neoplasia is more often detected in the form of VIN and in all cases is associated with HPV of high oncogenic risk; in women of pre- and postmenopausal age - at the stage of invasive vulvar cancer, rarely associated with HPV (30%). Young patients are characterized by multifocality, and in pre- and postmenopausal age - monofocal lesion.

Keywords: VIN (vulvar intraepithelial neoplasia), vulvar cancer, women of reproductive age, HPV, multifocal, monofocal.

This pathology is a visually accessible form of a malignant tumor, however, more than 50% of patients are admitted to a specialized medical institution with common forms of the disease, and its frequency among malignant tumors of the genitals in recent years has increased from 5 to 8% [1,2,3,4,5].

The stable fourth rank place of vulvar cancer in the structure of oncogynecological morbidity creates a false impression of stability and a relatively favorable situation associated with this pathology. The steady increase in the incidence of precancer, intraepithelial and invasive vulvar cancer significantly increases the proportion of this cohort of patients. Meanwhile, now there is every reason to improve the system of early diagnosis and treatment of this pathology [2,5,6,7,8].

No other localization of gynecological cancer has such a close association with postmenopause and involutive-atrophic processes of this period of a woman's life. [6,9,10,11,12,13].

However, over the past ten years, there is evidence of an increase in morbidity in young people, the proportion of which is 15%. The average age of development of the tumor process has decreased from 55 to 35 years, which poses with particular urgency the development of organ-preserving methods of treatment, the use of which is possible only in the early stages of the tumor process (VIN, T in situ, T1) [11,14,15,16, 17,18].

Despite the fact that dystrophic diseases of the vulva are well known to clinicians since the end of the last century, until recently there is no clear and complete understanding of their etiology and pathogenesis. The most well studied and substantiated are the hormonal, viral-infectious (role of HPV) and neuro-endocrine theories.

It would seem that the visual localization of vulvar cancer should serve as a reason for a timely diagnosis. However, every second patient is admitted to a specialized medical institution with stage III-IV disease. In turn, the cause of every second case of advanced cancer is delayed diagnosis. Long-term treatment of background processes without morphological verification of the diagnosis is the main reason for delayed diagnosis. [1,2,6,15,19,20]

The preliminary diagnosis of vulvar pathology is based primarily on specific complaints, data from a thorough examination and additional research methods (vulvoscopy, cytological examination).

During the examination, the mucous membranes are assessed: large and small labia, the degree of hair growth, color, moisture, the presence of pathological elements on the skin.

Vulvoscopy in dystrophic diseases and cancer of the vulva in some cases allows you to detect "suspicious" areas, atypia of blood vessels, in most cases, hyperkeratosis is detected, which limits the diagnostic capabilities of the method. Most often, this diagnostic method makes it possible only to clarify the diagnosis

and select sites for biopsy. [5,11,14,19,20,21,22]

In clinically clear cases of cancer, as well as in ulcerative forms of initial carcinoma and melanoma, cytological examination confirms the diagnosis. At the same time, VIN and pre-invasive cancer, in which pathological processes begin in the deep layers of the epidermis, may not be detected by cytological examination.

Unfortunately, in cytological examination, vulvar cancer is confirmed only in 50% of cases, in the rest - dys- and parakeratosis was detected. For the same reason, it is inappropriate to take smears-prints (Pap-smear) for cytological examination from the tissues of the external genital organs.

In the works of foreign researchers on the diagnosis of vulvar diseases, an assessment of the cytological method is given. However, due to the disappointing results (the sensitivity of the method is 32%), the authors emphasize that the gold standard currently remains the histological study of vulvar pathology, the information content of which is largely determined by the exact choice of biopsy sites. [5,7,11,12,14,21,23]

The purpose of the study is to identify the features of the clinical course of precancer and early cancer of the vulva in women of reproductive age.

Materials and methods

For the period from 2011 to 2014, 110 patients with dystrophic diseases, precancer and initial cancer of the vulva were carried out in the gynecological department of Herzen NMRRC, a full range of examinations with an analysis of clinical features and identification of the sequence of effects of various factors that form the prerequisites for the development of dystrophic diseases and neoplasias of the vulva.

Analysis of outpatient records and case histories of all women allowed us to further study the features of the clinical course of pathological processes of the external genital organs, depending on age.

The age of patients in the study ranged from 18 to 70 years (36 ± 3.5)

All patients were divided into two main groups. The first consisted of patients of pre- and postmenopausal age (from 49 to 70 years), the second - of reproductive age (from 18 to 49 years). When analyzing the age distribution of patients, practically equal cohorts in terms of number were revealed (table № 1):

Distribution of patients by age (table 1).

Groups	Number of patients (abs.)	Number of patients (%)
I. Patients of pre- and postmenopausal age	60	54.5
II. Patients of reproductive age	50	45.5
Total	110	100

Menstrual function was unchanged in 72 (65%) of 110 women. Menarche age ranged from 11 to 18 years (mean age 14.5±0.3 years). The average duration of the menstrual cycle was 28±0.4 days. Thus, there were no significant menstrual dysfunctions.

Most of the patients have repeatedly consulted gynecologists and dermatologists for itching and discomfort in the external genital area. The doctor carried out conservative treatment of "leukoplakia and kraurosis" for many months, and sometimes years, without histological clarification of the diagnosis. More than half (n=78-71%) of patients underwent long-term and unreasonable anti-inflammatory or hormonal therapy with unsatisfactory results without cytological and/or histological studies, aimed only at eliminating symptoms.

The duration of the anamnesis in 54.5% of cases was more than 1 year. During this period, the appointment of various ointments and creams, sedatives, vitamins, hormonal drugs often relieved or reduced itching, discomfort and pain. The patients, feeling relieved, stopped visiting the doctor. Subsequently, 40% had dysplastic processes of varying severity and initial forms of vulvar cancer.

The above indicators serve as a reason for a critical revision of the methods of examining patients with this pathology. Inadequate interpretation of complaints and objective data obtained during the examination of women, insufficient oncological vigilance of doctors and the lack of proper clinical experience for a correct assessment of the condition of the external genital organs leads to an increase in the number of advanced forms of tumor processes.

According to the data of a planned histological examination of vulvar biopsies, in the 1st group of patients, lichen sclerosus was diagnosed in 28 patients (47%), squamous cell hyperplasia - in 8 patients (13%), VIN I - VIN III - in 8 patients (13%), vulvar cancer stage I A was detected in 16 patients (27%) (table 2).

Table 2. *Distribution of patients according to the morphological structure of pathological processes of the vulva in the group of patients of pre- and postmenopausal age*

Morphological research data	Number of patients (abs.)	Number of patients (rel.) (%)
Lichen sclerosus	28	47
Squamous cell hyperplasia	8	13
VIN I	2	3
VIN II	2	3
VIN III	4	7
Vulvar cancer stage I A	16	27
Total	60	100

Thus, in the first group, patients with a diagnosis of stage I A vulvar cancer (27%) prevailed in comparison with vulvar intraepithelial neoplasia (13%). Clinically, early cancer of the vulva presented as a small nodule or warty, cauliflower-like mass. In 2 patients, vulvar lesions were presented as hyperpigmented, light-brown formations rising above the surface.

In 47% of pre- and postmenopausal women, lichen sclerosus was diagnosed, which links this disease with age-related changes in the vulva. The clinical picture of lichen sclerosus was determined by the age and severity of the pathological process. If in the early period of the disease in most patients the mucous membrane was depigmented, whitish in color, then, as the progression progressed, there was a decrease in hair growth in the pubic area and labia majora, the skin and mucous membranes were smoothed, their folding was noted with a violation of elasticity.

The leading symptom (93%) in patients in this group was persistent and painful itching, which in most patients led to disability and a decrease in the quality of life. Most likely, itching is based on violations in the trophism of the tissues of the external genital organs, which lead to thinning, dryness, the appearance of cracks and abrasions due to scratching. Soreness, burning, feeling of dryness, tension and tightening of the skin and mucous membranes were noted. In patients with a long history of the disease (54.5%), when sclerosis and atrophy became more pronounced, the clitoris and the labia minora were practically undetectable. Large lips in the form of thickened ridges limited the sharply narrowed entrance to the vagina, the mucocutaneous integument became rigid and acquired a pearly hue.

According to the data of a planned histological study in the 2nd group - patients of reproductive age - the morphological diagnosis of squamous cell hyperplasia was established in 25 patients (50%), lichen sclerosus - in 5 patients (10%), VIN I –VIN III - in 14 patients (28 %), stage I A cancer - in 6 patients (12%). (table 3)

Table 3. *Distribution of patients according to the morphological structure of pathological processes of the vulva in the group of patients of reproductive age*

Morphological research data	Number of patients (abs.)	Number of patients (rel.) (%)
Lichen sclerosus	5	10
Squamous cell hyperplasia	25	50
VIN I	6	12
VIN II	6	12
VIN III	2	4
Vulvar cancer stage I A	6	12
Total	50	100

Thus, analyzing the data obtained, in the majority of patients of reproductive age, the morphological diagnosis of vulvar intraepithelial neoplasia (29%) prevailed in comparison with the invasive tumor process (12%) and was asymptomatic in more than 50% of cases. At the same time, itching was the dominant manifestation in the rest of the patients. In more than 60% of women, VIN was multifocal. Clinically, VIN lesions appeared as discrete or confluent painless papules or plaques with uneven margins. On the skin surface, the lesions were presented in the form of whitish plaques with hyperkeratosis, on the mucous membrane - in the form of pink or red papules. It should be noted that the risk of progression of intraepithelial neoplasia (VIN) to invasive cancer in women of reproductive age is rare. It is estimated at about 5%. Consequently, a thorough examination of this contingent of patients allows avoiding the further development of the tumor process. [6,14,24]

Squamous cell hyperplasia was found in 50% of patients of reproductive age. The clinical picture of the latter was represented by itching (n=19-76%), which was less pronounced than in the 1st group, and brought significantly less suffering to patients. Patients complained of the presence of whitish plaques localized on the labia majora, clitoris, in the folds between the labia majora and labia minora, less often occupying the entire surface of the vulva.

If lichen sclerosus is characterized by diffuseness and symmetry of the lesion, which in our study was recorded in 26 patients (93%), then with squamous cell hyperplasia we observed a focal nature of the process. At the same time, the changes in all patients of this group came from different areas of the external genital organs. Its most frequent localization was the labia majora and minora (n=24-73%), less often - the clitoris, posterior commissure, perineum (n=9-27%). The degree of aggressiveness of the course of the vulvar tumor increases from the posterior commissure to the clitoris. [12,13,20,23,25]

The next stage of the study was associated with the study of the infectious component in precancer and initial cancer of the external genital organs. Attention should be paid to the complete absence of examinations aimed at identifying human papillomavirus infection in pre- and postmenopausal women. Usually, a gynecologist at the examination established the diagnosis of "kraurosis of the vulva" (the terminology of the old classification). The examination was limited to visual examination and the appointment of ointment therapy to relieve itching.

However, at present, many authors associate an increase in the incidence of vulvar cancer with an increase in the number of women suffering from PVI, which indicates the important role of HPV in the multistep process of carcinogenesis. [8,10,15,17,21,26,27,28]

In this study, testing for vulvar HPV DNA by PCR was performed in all 110 patients. Among 60 women of pre- and postmenopausal age, papillomavirus in-

fection was detected in 46 (77%) patients. At the same time, 16 and 18 types were found in 18 (30%) patients; Types 31 and 33 - in 10 (17%) patients; 6 and 11 types - in 18 patients (30%), the absence of HPV - in 14 patients (table 4).

Table 4. HPV typing in pre- and postmenopausal patients

Virus type	Number of patients (abs.)	Number of patients (rel) (%)
type 16, 18	18	30%
type 31, 33	10	17%
type 6, 11	18	30%
Lack of HPV	14	23%

Among 50 women of reproductive age, papillomavirus infection was detected in 45 (90%) patients. At the same time, 16 and 18 types were found in 29 (58%) patients; 31 and 33 types - in 10 (20%) patients; 6 and 11 types - in 6 patients (12%), the absence of HPV - in 5 (10%) patients (table 5).

Table 5. HPV typing in patients of reproductive age

Virus type	Number of patients (abs.)	Number of patients (rel) (%)
type 16, 18	29	58%
type 31, 33	10	20%
type 6, 11	6	12%
Lack of HPV	5	10%

It should be noted that the presence of human papillomavirus infection in the overwhelming majority of patients was not accompanied by any clinical manifestations.

Thus, the frequency of detection of HPV DNA was largely associated with the age of the examined group. The peak HPV level was observed in young women (90%), while in 78% HPV was represented by types of high oncogenic risk (16,18,31,33) and in 100% it was associated with a malignant process. HPV infection in pre- and postmenopausal patients in this study is quite high (77%), but it is represented by a diverse range of HPV: both high oncogenic risk - 16.18 and 31.33 types (30% and 17%, respectively), and low oncogenic risk - 6.11 types (30%), in almost equal proportions. At the same time, VIN and initial vulvar cancer in this group are associated with HPV only in 30% of cases.

In pre- and postmenopausal women, due to the predominance of background dystrophic changes in the form of lichen sclerosus, the morphological diagnosis of

VIN of varying degrees is established quite rarely, invasive cancer is more often diagnosed. The analysis of the above allows us to consider lichen sclerosus as a disease preceding cancer of the external genital organs. This contingent of patients must be carefully and comprehensively examined with constant dynamic observation. [20,22,23,25,28]

At the same time, in young patients, the underlying disease is squamous cell hyperplasia, where the sequence of tumor development (VIN I - VIN II - VIN III) is traced more clearly and largely resembles the development of cervical cancer. It was noted that in young women PVI is usually temporary in nature, there is a more rapid spontaneous elimination of the virus and regression of the existing HPV-associated pathology compared to women of a later age. In this group, HPV types of high oncogenic risk are most often found (16, 18, 31, 33), which account for 78%. Consequently, the inclusion of PCR diagnostics in the examination algorithm of patients with dystrophic processes of the vulva is beyond doubt. The results obtained make it possible to convincingly and purposefully plan measures for the prevention of virus-induced cancer. [10,16,22,24,26,27,28]

Thus, the high frequency of untimely diagnosis of precancer and initial vulvar cancer is due to long-term self-treatment of patients, unjustified anti-inflammatory and hormonal therapy, improper sampling of material for cytological and histological studies, and the lack of oncological alertness among general practitioners. [1,2,6,15,21,23]

Conclusion

The diagnosis of precancer or initial cancer that developed against the background of dystrophic lesions of the vulva is difficult to establish. The existing diagnostic methods are not effective enough, therefore, risk factors (viral infection, biological aggressiveness of the tumor) must be taken into account, which make it possible to select a contingent of patients with pathology of the external genital organs. In this situation, competent planning of diagnostics and its highly qualified implementation plays a decisive role for the patient's fate.

At a young age, the pathology of the vulva is clinically more often manifested in the form of squamous cell hyperplasia, and in the pre- and postmenopausal - in the form of lichen sclerosus.

Based on the foregoing, in women of reproductive age, vulvar neoplasia is more often detected in the form of VIN and in all cases is associated with HPV of high oncogenic risk; in women of pre- and postmenopausal age - at the stage of invasive vulvar cancer, rarely associated with HPV (30%).

One of the features of the clinical course of vulvar neoplasia in women of reproductive age is the characteristic development of several foci of malignancy, which occur synchronously or metachronically. Multifocality of the tumor is an important unfavorable prognostic factor for the course of precancer and vulvar

cancer, which often leads to errors in diagnosis. In patients of pre- and postmenopausal age, the malignant process is more often detected at the stage of a monofocal invasive tumor.

The efforts of scientists from different countries for many decades have been aimed at developing new and effective approaches in the diagnosis of malignant neoplasms of the vulva. By now, considerable scientific and clinical material has been accumulated, however, the results of diagnostics of patients with malignant tumors of the vulva cannot be regarded as satisfactory and require further research.

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DOI 10.34660/INF.2021.60.40.017

SOME ASPECTS OF NON-SPECIFIC PREVENTION OF INFECTIONS ASSOCIATED WITH THE PROVISION OF MEDICAL CARE IN MEDICAL ORGANIZATIONS

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Abstract. *Healthcare-associated infections (HAI) are considered as one of the most acute problems of modern health care. Analyzed the statistical data, as well as the quality of registration of cases of HAI in medical organizations, identified the problems of infection control in medical organizations and ways to eliminate them.*

Keywords: *HAI, registration, statistics, damage, infection control, penalties for violations of the anti-epidemic regime.*

Nosocomial infections (NE) are any clinically expressed diseases of microbial origin that affect the patient as a result of his hospitalization or visit to a medical institution for treatment, as well as hospital staff due to their activities, regardless of whether symptoms of this disease appear or do not appear during the time spent by these persons in the hospital. This definition was proposed by the WHO Regional Office for Europe in 1979. [4]

An infection is considered nosocomial if it first appears 48 hours or more after being in the hospital, provided that there are no clinical manifestations of these infections at the time of admission and the likelihood of an incubation period is excluded. [5].

In modern conditions of development of healthcare and humanity, prevention of healthcare-associated infections (HAI) is one of the global problems of the world. Today, the activities of a significant number of scientists, numerous healthcare practitioners and most large companies that present their products and services on the world market are subordinated to the solution of these serious issues.

At present, it is difficult to overestimate the social and economic damage that HAI inflicts annually on the world community. Thus, according to official statistics, in the United States more than 2 million patients suffer annually from HAI, 88000 patients die, the annual economic damage is 4-10 billion dollars; in the UK,

taking into account the registered HAI, inpatient treatment of patients increases by 3.6 million days, the annual economic loss is about 1 billion pounds [1-3].

The urgency of the HAI problem is determined by their widespread occurrence in medical institutions of various profiles and the significant damage caused by these diseases to the health of the population. [6]

The problem associated with the lack of registration of real cases of HAI in medical and preventive organizations (MPO) and, as a consequence, the provision of inaccurate statistics is of great importance. It is important to understand that the availability of statistics reflecting the real situation in the country will contribute to the improvement of methods for solving the existing problem.

According to statistics, HAI affects 5-10% of patients in hospitals, and ranks tenth among the causes of mortality in the population. In Russia, according to official statistics, approximately 30 thousand cases of healthcare-associated infections are registered annually (~ 0.8 per 1,000 patients), but experts believe that their true number is at least 2-2.5 million people. Depending on the action of various factors, the incidence of NE fluctuates. [7]

Patients with HAI stay in the hospital 2-3 times longer than similar patients without signs of infection. On average, their discharge is delayed by ten days, the cost of treatment increases by 3 to 4 times, and the risk of death is 5 to 7 times. [7]

Registration of nosocomial infections is carried out in all treatment and prophylactic organizations in accordance with the current procedure for statistical accounting. For each detected case of nosocomial infection, an urgent notification is promptly sent to the territorial center of the FBUS "Hygiene and Epidemiology". [7]

In matters of HAI prevention in hospitals, middle and junior medical personnel are assigned the main, dominant role of the organizer, the responsible executor, and also the controller. Daily, careful and strict fulfillment of the requirements of the sanitary-hygienic and anti-epidemic regime in the course of the performance of their professional duties and forms the basis of the list of measures for the prevention of HAI. [8]

The number of nosocomial infections (healthcare-associated infections, HAI) in Russia reaches 25-30 thousand cases per year, but this statistic is significantly underestimated, experts say. However, today we can talk about a clear underestimation of cases of nosocomial infection. The real figure is actually much higher - 2–2.5 million cases. Despite the fact that the number of nosocomial infections in the country as a whole has decreased by 20% over the past ten years, the error in the HAI statistics in Rospotrebnadzor was noted earlier. In particular, the department revealed facts of concealment of data on nosocomial morbidity and other violations in medical organizations, including cases of late isolation of patients, untimely start of anti-epidemic measures, violation of the rules for maintaining

functional rooms, as well as non-compliance with antiseptic requirements when working with sterile material. [10]

The way to solve the existing problem at present is to improve the quality of medical care by improving the infection control system inside the hospital, as well as by making changes to the regulated regulations regarding the control of the anti-epidemic regime.

First, the number of general cleanings should be at least doubled. At the moment, according to SanPiN 2.1.3.2630-10 "Sanitary and Epidemiological Requirements for Organizations Carrying out Medical Activities", general cleaning of the ward premises should be carried out at least once a month. General cleaning of the operating unit, dressing rooms, delivery rooms, treatment rooms, manipulation rooms, sterilization rooms and other aseptic rooms is carried out once a week. [11] We propose to increase the number of general cleaning up to 1 time per week in ward rooms, up to twice a week in operating and delivery rooms.

Secondly, it is necessary to increase the number of control checks in medical institutions by strengthening the epidemiological and microbiological control of the activities of the medical and prophylactic institution.

Thirdly, the proper control over the observance of sanitary rules and hygienic standards will be at the highest level if the degree of punishment for non-compliance is increased. According to Article 6.3. "Violation of the legislation in the field of ensuring the sanitary and epidemiological well-being of the population" of the Code of the Russian Federation on Administrative Violations, violation of the legislation in the field of ensuring the sanitary and epidemiological well-being of the population, expressed in violation of the current sanitary rules and hygienic standards, failure to comply with sanitary and hygienic and anti-epidemic measures, entails a warning or the imposition of an administrative fine on citizens in the amount of one hundred to five hundred rubles; for officials - from five hundred to one thousand rubles; for persons engaged in entrepreneurial activities without forming a legal entity - from five hundred to one thousand rubles or administrative suspension of activities for up to ninety days; for legal entities - from ten thousand to twenty thousand rubles or administrative suspension of activities for up to ninety days.

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DOI 10.34660/INF.2021.73.17.018

DEVELOPMENT OF NATURAL ULTRAPURE HYDROGEN PEROXIDE AND ITS APPLICATION IN AGRICULTURE AND MEDICINE

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Abstract. *The characteristics and areas of application of a new agent for stimulating plant growth and development, antiseptic treatment and prevention of coronavirus and bacterial infection based on environmentally friendly and sterile aqueous solutions of hydrogen peroxide, obtained by methods of electrophysical action on distilled water, are considered. The absence of chemical stabilizing additives makes ecoperoxide hydrogen a versatile broad-spectrum agent with proven efficacy for both large-scale and home use.*

Keywords: *hydrogen ecoperoxide, environmentally friendly aqueous solutions, plant growth stimulation, antiseptic treatment, prevention of coronavirus and bacterial infection.*

Introduction

The aim of the work is to study the characteristics and areas of application of natural ultrapure hydrogen peroxide in agriculture, veterinary medicine and medicine.

Together with the scientists of the laboratory of photobionics of the Federal Research Center of Chemical Physics of RAS, FSBSI FSAC VIM and RPA "Hydrogen Ecoperoxide" under the scientific supervision of Academician of the

Russian Academy of Sciences D.S. Strebkov research has been carried out and methods and technical means have been developed for obtaining ecologically pure aqueous solutions of hydrogen peroxide from distilled water to stimulate plant growth and prevent viral and bacterial infections [1].

This technology has no analogues in the world in terms of environmental parameters. An environmentally friendly solution of hydrogen peroxide obtained in accordance with patent applications is called "Ecoperoxide".

At present, an interstate standard is used to obtain hydrogen peroxide (peroxide), which “applies to aqueous solutions of hydrogen peroxide obtained by the electrochemical method through persulphuric acid (medical and technical grade A) and by the organic method based on liquid-phase oxidation of isopropyl alcohol (technical grade B)” [2], which is accompanied by the addition of toxic stabilizing additives (sulfuric acid, sodium benzoate, arsenic, etc.) to the obtained highly concentrated solution of hydrogen peroxide to prevent its decomposition, which is achieved by binding the stabilizer with H_2O_2 . It is the presence of toxic stabilizers in hydrogen peroxide solutions obtained in accordance with GOST 177-88 that does not allow their use in veterinary medicine, agriculture, including plant growing, as well as medical practice, with the exception of external use. As follows from GOST 177-88, hydrogen peroxide is intended for use in the chemical, pulp and paper, textile and medical industries. In addition, hydrogen peroxide bound by the stabilizer is less effective than in the free state as applied to biomedical processes and reactions. In the case of intravenous administration of hydrogen peroxide solution, which is practiced abroad, this is preceded by an expensive purification from toxic stabilizers and any chemical impurities.

Environmentally friendly hydrogen peroxide

In accordance with [3], the presence of hydrogen peroxide at a mass concentration of up to $100 \mu\text{g}/\text{dm}^3$ ($0.1 \text{ mg}/\text{l}$) is a sign of the biological usefulness of natural water, and the absence of hydrogen peroxide in natural water is a sign of deterioration of the biological usefulness of natural water.

It is known that rainwater has a stimulating effect on the growth and development of plants, which is associated with the content of hydrogen peroxide (peroxide) in it (H_2O_2) from 0.4 to $2.8 \text{ mg}/\text{l}$, which is formed in the atmosphere. Back in the 19th century, it was established that in Moscow the concentration of hydrogen peroxide was "in rainwater" 0.4 – 2.8 mg . for 1 liter". In the southern regions, due to high solar activity, the concentration of hydrogen peroxide in rainwater reaches $2.8 \text{ mg} / \text{l}$ [4, 5, 6].

An environmentally friendly solution of hydrogen peroxide with a concentration exceeding the natural one, obtained as a result of electrophysical action on

water. When it was obtained, the natural mechanism of the formation of hydrogen peroxide in the atmosphere was reproduced. Eco-peroxide "is stable during storage, which is essential for its practical application.

Ecoperoxide is a non-explosive, non-flammable, non-corrosive, non-toxic solution, does not pose a hazard to the environment, and is safe for transportation by any means of transport. Ecoperoxide is produced with a hydrogen peroxide concentration of 10 mg / l in a volume of 0.1 and 5 liters and with a concentration of 1.5 mg / l in a volume of 1 and 5 liters.

Using eco-peroxide to stimulate plant growth and development

Ecoperoxide is effective for stimulating plant growth and development, including those eaten raw or processed. Ecoperoxide has a beneficial effect on plants, increasing resistance to diseases and adverse factors, accelerates flowering and improves the quality of fruits.

Experimental testing of Ecoperoxide diluted to a concentration of rainwater (0.3 - 2.8 mg / l) on various species and varieties of cultivated plants yielded the following results: increase in seed germination from 20 to 50%;

acceleration of growth of aboveground and root systems of plants by 35-80%;
an increase in biomass by 15–40%;

a significant increase in the quality of plants with an increase in the content of chlorophyll in them up to 20%.

When processing seeds in eco-peroxide, seeds are disinfected, biological processes are stimulated, metabolism, saturation with useful microelements, improved germination, resistance to diseases, increased immunity, and faster germination of seeds. An increase in yield and product quality is also achieved by spraying an aqueous solution of hydrogen peroxide with a natural concentration of 1 - 2.8 mg / l with cold fog installations of grain, vegetable and fruit and berry plants, including using quad-copters (Fig. 1, 2).



Fig. 1. Kit for spraying eco-peroxide in horticulture



Fig. 2. Eco-peroxide sprayer for vegetable and fruit tree plantations

Ecoperoxide, after appropriate dilution, can be used both in small farms (farms, personal plots, gardening partnerships, urban gardens), and in large (agricultural enterprises specializing in the cultivation of grain, vegetables, fruit and berry, decorative and other crops, including the use of greenhouses, aero- and hydroponics technologies, capillary irrigation, in areas with high solar radiation, with short

daylight hours and beyond the Arctic Circle, as well as in forest nurseries for afforestation, reforestation, urban greening, as well as the cultivation and maintenance of high quality grassy covers of lawns, golf and football fields.

Ecoperoxide for disinfection and prevention of coronavirus and bacterial infections

Hydrogen peroxide is traditionally used as an antiseptic. At the same time, even such pathogenic microbes as the causative agents of cholera and typhoid fever, anthrax spores, which are very stable in the external environment, die. The ability of hydrogen peroxide (when administered intravenously) to successfully fight bacterial, fungal, parasitic and viral infections, as well as stimulate the immune system and prevent the growth of tumors has been established by a large number of laboratory and clinical studies. After intravenous injection of H₂O₂ into the body, killer cells, T-lymphocytes, responsible for the tension of the immune system, acquire a higher activity [7, 8, 9].

Aging magazine published an article by employees of Tel Aviv University and Shamir Medical Center. Research Director Professor Shai Efrat Sackler School of Medicine. The article says that after 60 sessions of hyperbaric oxygen therapy, patients showed an elongation of telomeres by 38% and a decrease in the number of dying cells by 37%. Telomeres are the DNA sequence at the ends of chromosomes. When telomeres become short, the cell cannot reproduce and dies. The accumulation of cells unable to divide is one of the causes of aging.

Ecoperoxide is a carrier of atomic oxygen and, according to GOST 32460-2013, the presence of hydrogen peroxide in drinking water is a sign of the biological value of natural water.

The ecological and safe composition makes eco-peroxide a universal disinfectant, antiseptic, non-allergenic agent.

The scope of application of eco-peroxide is medicine, cosmetology, veterinary medicine, sanitary and hygienic processing in everyday life and at work.

Eco-peroxide can be used to sanitize the mouth, throat and nasal cavity by rinsing or irrigating. To protect the respiratory tract from coronavirus and bacterial infections, it is advisable to use nebulizers that provide spray droplets of up to 5 microns. In fig. 3 shows an Omron Comp Air NE-C74 nebulizer for inhalation with an air compressor, Japan. The maximum volume of the container is 7 ml. Creates an airborne mixture with droplets of 1 - 5 microns at a rate of 0.3 ml / min. The air-borne mixture is delivered through a face mask or nozzles for the mouth and nose for 5 minutes. A solution of eco-peroxide in distilled water with a concentration of 1 - 5 mg / l is used. The concentration of hydrogen peroxide, the duration and frequency of inhalations must be agreed with the attending physician.



Fig. 3. Nebulizer with air compressor

In fig. Figures 4, 5 show samples of portable nebulizers with an ultrasonic peroxide spray.

As a disinfectant, eco-peroxide is effective and does not cause allergies when treating skin (for example, hands, face, nipples of a nursing mother) and wounds with capillary blood flow. For the purpose of disinfection, it is also possible to process clothes, surfaces, equipment, appliances, rooms, kitchen utensils, feed, animals, birds, aquariums, swimming pools. Removes the odor associated with the vital activity of microorganisms, for example, in the mouth, as well as when keeping animals, birds, aquarium fish. It is a wonderful, eco-friendly, non-allergenic means of preventing mastitis in cows. Experimental batches of eco-peroxide for the prevention of coronavirus infection were delivered to India and Ukraine.



Fig. 4. Compact portable nebulizer, made in China. Dimensions: 140 x 110 x 60 mm, container capacity 10 ml, spray rate no less than 0.25 ml / min, droplet size no more than 3.7 microns, powered by AA batteries or via USB cable



Fig. 5. Portable medical inhaler for children and adults. Power consumption 2 W, operating frequency of the piezoelectric nebulizer 110 kHz, container capacity 10 ml, atomization rate not less than 0.25 ml / min, droplet size not more than 3.7 microns, powered by AA batteries or via USB cable 5 B, 1 A

Conclusion

In 2020, RPA Ecoperoxide of Hydrogen LLC was established as a startup for the production of environmentally friendly aqueous solutions of hydrogen peroxide to stimulate plant growth, antiseptic treatment and prevention of coronavirus and bacterial infections.

The patented technology makes it possible to produce an aqueous solution of H₂O₂ without toxic stabilizing additives while maintaining the disinfecting and antiseptic properties of standard hydrogen peroxide. Eco-peroxide also effectively stimulates plant growth and development.

Ecoperoxide is a universal product with a wide range of actions with proven effectiveness, suitable for both professional and home use. The potential of eco-peroxide is very large, from increasing the yield of grain, vegetables and fruit and berry crops to preventing coronavirus and bacterial infections, from treating animals and birds to preventing diseases when growing fish in ponds and disinfecting water in swimming pools. We need millions of liters of eco-peroxide and production in all regions of Russia. We need support for a startup from investors and the state.

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INTELLIGENT INDUSTRIAL INTERNET OF THINGS (IIOT)

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Abstract. *Currently, artificial intelligence technologies have begun to attract special attention at the state level. The development of artificial intelligence technologies will make quick and optimal decisions based on the analysis of large amounts of data, and will also give great advantages in the quality and effectiveness of engineering design and production management.*

The foundation of artificial intelligence is knowledge. Knowledge is initially classified according to the attributes “clarity”, “accessibility”, “propositionality” and “level of abstraction”. To build a bank of engineering knowledge, on the basis of clarity, knowledge must be explicit, on the basis of accessibility, interorganizational, on the basis of propositionality, active, and on the level of abstraction, common.

There are two categories of knowledge - passive and active. Passive knowledge is text documents stored in books, methods, and the like. To transform this knowledge into artificial intelligence systems, a highly efficient technology is needed that allows knowledge carriers to create knowledge bases without the involvement of programmers. This technology is described in this article.

Keywords: *artificial intelligence, Industry 4.0, digital manufacturing, intelligent systems, intelligent design and management systems.*

Introduction

Industrial digitalization is based on artificial intelligence (AI) methodology. By 2025, it is projected to quadruple the cost of AI adoption. The use of artificial intelligence will become a ubiquitous standard, as in many cases it is the only way to remain competitive.

Currently, sophisticated technologies associated with processing big data and cloud technologies, which have security problems, are used to create intelligent production control systems. To do this, you need to involve IT companies. This is difficult for small and medium-sized industries. What are needed are simple tools available for such industries. The data should be neither large nor small, but

necessary and sufficient and based on existing standards, and in this case - ESTD.

As for knowledge, it must be contained in the knowledge bases of industries. At the same time, an empty technology of consciousness of such knowledge bases is needed, based on the language of "business prose", as close as possible to natural language and to be available for development by non-programming users.

These are the methods described in this article.

The digitalization of mechanical engineering should be based on the latest technologies of the industrial Internet of things IIoT (Fig. 1) and, in particular, on intelligent IIIoT.

A distinctive feature of IIIoT is the convergence of information technology (IT) and operational technology (OT). In IT, operations represent the knowledge base modules described below. In this case, it is advisable to divide the OT operations into two classes: the OT operations themselves, which are technological operations associated with changing the properties of the object being processed, and the OL operations, which are logistic operations associated with changing the location of objects

OTs are designed in advance in technological design systems and loaded into the database in relation to those items that are subject to processing at a given time. Logistic operations are generated dynamically by the production execution system as required.

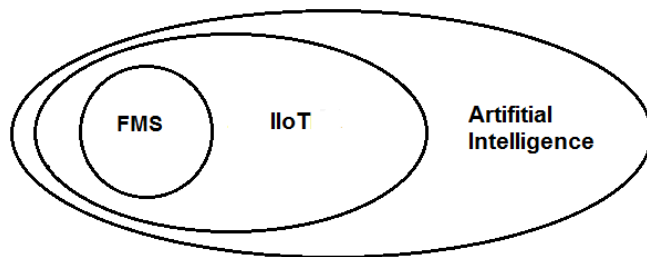


Fig. 1. General scheme for creating intelligent factories

The technical basis for the creation of intelligent manufacturing is flexible manufacturing systems (FMS). FMS is a set in various combinations of equipment with CNC, robotic technological complexes, flexible production modules, individual units of technological equipment with CNC and systems for ensuring their operation in automatic mode for a given time interval, which has the property of automated changeover during production of items of arbitrary nomenclature within the established limits of the values of their characteristics (GOST 26228-85).

The main structural elements of the FMS are a robotic technological complex (RTK), a flexible production module (FPM) and a system for ensuring functioning.

Purpose of the study - At present, using the software of the Russian company "Center SPRT-T", an intelligent system for semi-automatic design of mechanical engineering products has been developed [1]. To create end-to-end digital technologies, it is necessary to develop an intelligent control system for a flexible manufacturing system (FMS) capable of manufacturing the designed objects.

As such a GPS can be used a training mini FMS, created in England at the firm "Denford" and installed at the Moscow State Technical University (BMSTU) (Fig. 2).

FMS "Denford" includes two lathe modules 1 and milling 2. In addition, there is a product control facility 3. The transportation and storage system of the FMS includes a belt conveyor 4 and an automated warehouse 5.

Intelligent ACS FMS should provide the following functions:

1. Selecting a production facility
2. The choice of the technological process of production
3. Selection of technological operation of production and equipment
4. Delivery of technological equipment
5. Adjustment of technological operation
6. Delivery of the processing object
7. Manufacturing processing
8. Control of processing results
9. Warehousing of the processed object
10. Execution of final operations and storage of equipment

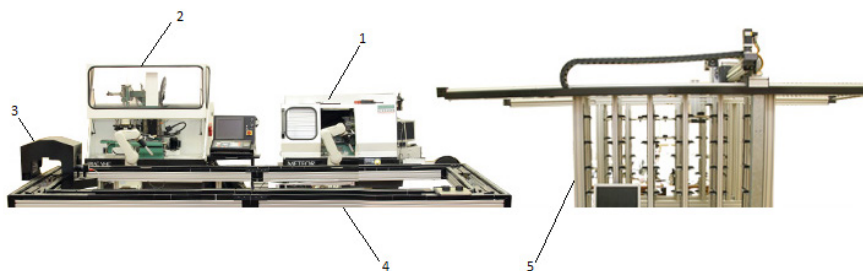


Fig. 2. Mini FMS "Denford": 1-lathe module, 2-drilling and milling module, 3-product control module, 4-belt conveyor. 5-warehouse

Materials and methods

Fig. 3 shows a functional model of a production system. Here at the entrance there are blanks, materials, semi-finished products $X = (x_1, x_2, \dots, x_n)$. Output -

products and waste $Y = (y_1, y_2, \dots, y_n)$. Management includes production plans $U = (u_1, u_2, \dots, u_n)$ and disturbances $E = (e_1, e_2, \dots, e_n)$, and mechanisms are production resources R .

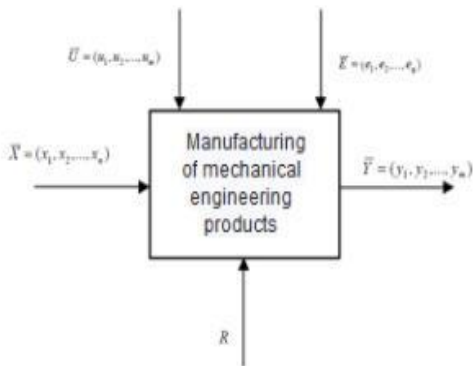


Fig. 3. Production system model

Fig. 4 shows a class diagram of digital production facilities. From the number of input objects, it displays blanks, materials and components.

The knowledge base of the intelligent control system of FMS is a semantic network of agents (Fig. 5). It provides the automated functioning of the FMS, which is necessary for solving the assigned production tasks.

Tab. 1
GPS transport operations

An object	Single production	In-line production
Blank	Warehouse Conveyor Robot 1 Workplace 1	Warehouse Conveyor Robot 1 Workplace 1
Semi-finished	Robot 1 Conveyor Conveyor	Robot 1 Conveyor Robot 2 Workplace 2
Semi-finished	Warehouse Conveyor Robot 2 Workplace 2	
Product	Robot 2 Conveyor Warehouse	Robot 2 Conveyor Warehouse

Transport operations described in Tab. 1 belong to the field of logistics

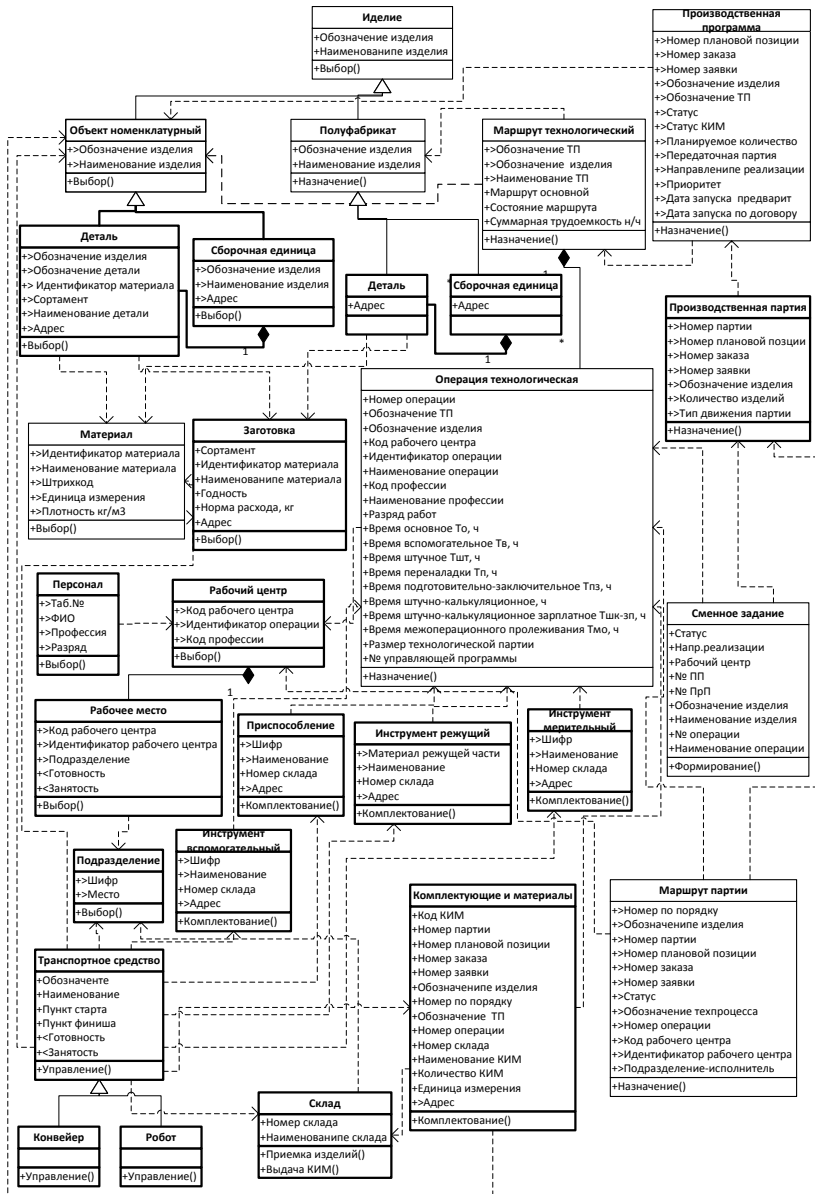


Fig. 4. Digital Manufacturing Object Class Diagram

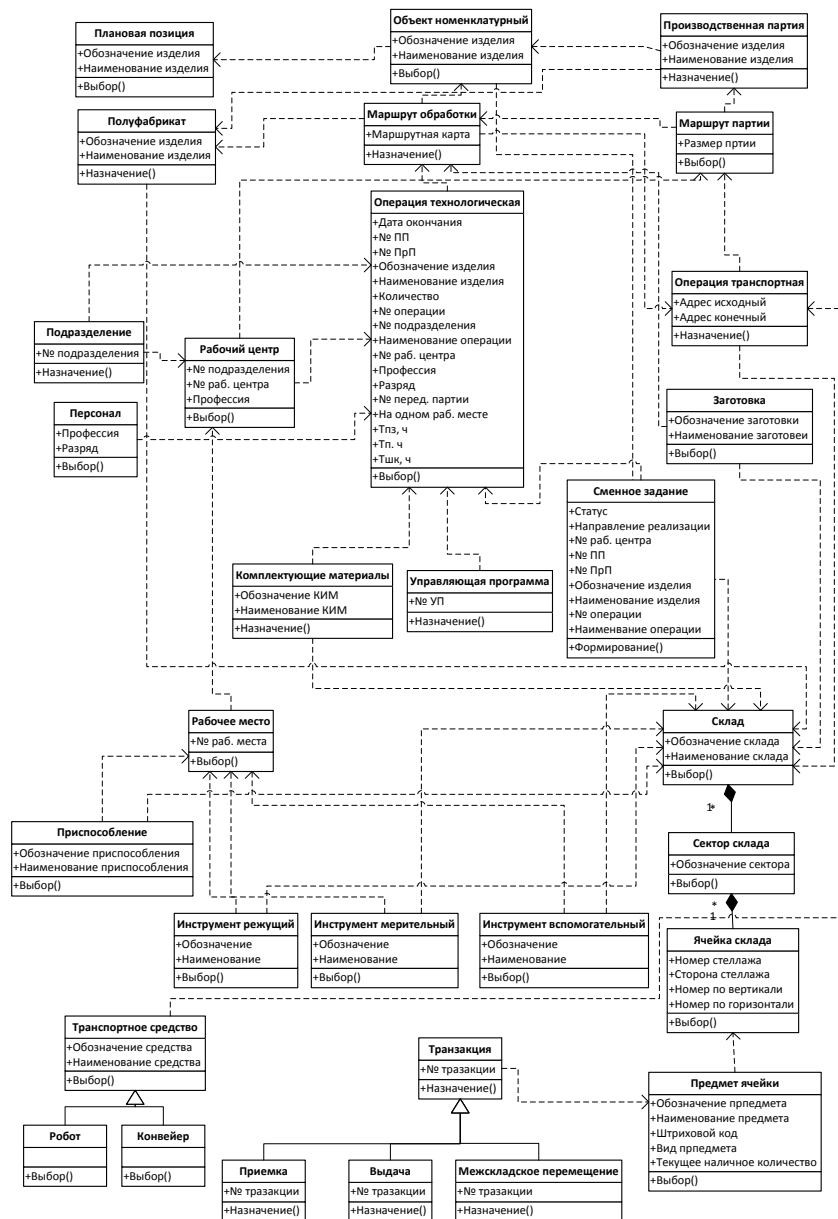


Fig. 5. FMS management system knowledge base

Results and discussion

Until recently, the Internet of Knowledge and the Internet of Things have evolved with little or no connection to each other. The Internet of Knowledge worked with virtual objects, and the Internet of Things - with real ones. To create intelligent control systems for flexible manufacturing systems, the integration of both directions is necessary. This is depicted in the object class diagram shown in Fig. 4, where virtual objects are contoured in thin lines, and real objects are in thick lines.

Conclusion

A method has been developed for creating knowledge bases for managing flexible production systems in mechanical engineering.

As the experience of operation of intelligent systems based on knowledge bases shows, the labor productivity of technologists increases 2-3 times, due to the automatic generation of technological processes. At the same time, there is an improvement in the quality of design results due to the use of the best proven solutions.

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FIELD RESEARCH OF THE FORMATION OF THE ICE COVER OF THE NOVOSIBIRSK RESERVOIR

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Abstract. *The article presents data from field studies of the ice cover at the Novosibirsk reservoir: the results of measurements of the ice thickness, the height of snow on the ice.*

Keywords: *Ice regime, ice thickness, ice structure, meteorological factors.*

The Novosibirsk reservoir was created on the Ob River 21 km above Novosibirsk and has a complex purpose. Water users are: municipal and industrial water supply; hydropower; water transport; fisheries; recreation. Also, the water resources of the Novosibirsk reservoir are used to regulate river flow. The reservoir diagram is shown in fig. 1.

The regime of the reservoir and water users is influenced by the state of the ice regime. At hydrological posts, observations are made of the thickness of ice, snow and ice phenomena.

The peculiarities of the ice regime are that its characteristics are constantly changing, not only during one season, but also from year to year, from region to region. Such variability does not allow obtaining unified dependences for predicting the parameters of the ice cover. Therefore, practically, any new data is unique in its kind, replenishes the database on the characteristics of ice, and field studies allow us to clarify: forecasts of ice phenomena; ice skipping schemes; the dimensions of the projected hydraulic structures and resolve issues related to the prevention of congestion.

Taking into account the above, the purpose of field studies was to obtain data on the increase in the thickness of the ice cover in the Novosibirsk reservoir.

In accordance with the set goal, the tasks of field studies included: study of the structure of the ice cover; measuring the thickness of ice and snow; monitoring the

change in meteorological elements.



Fig.1. Scheme of the Novosibirsk reservoir hydrological posts: 1 – Barnaul; 2 – Shelabolikha; 3 – Malyshevo; 4 – Dubrovino; 16 – Kruglikovo

Research methodology: measurements were carried out on a reservoir near the village of Kirza, Ordynsky district, Novosibirsk Oblast. There is no permanent hydrological post in this place. The expedition works were carried out in 2017, 2019, 2020 and 2021.

The study of the structure of the ice cover was carried out by examining samples cut from the thickness of the ice with a chainsaw. The thickness of the ice was determined with a measuring tape or rod by immersing it in the holes. The thickness of the snow was also measured with a measuring tape (fig. 2). The air and water temperatures were measured with a mercury thermometer, and the wind speed was measured with an anemometer.

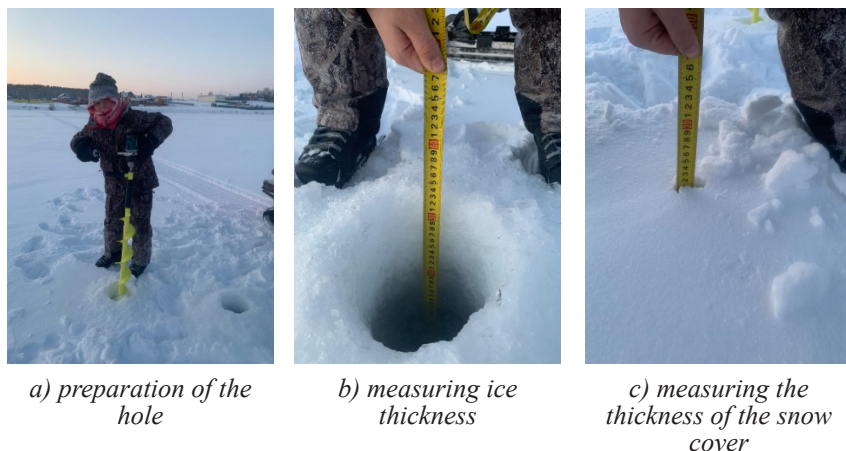


Fig. 2. Ice cover research during the expedition in winter 2020–2021.

The structure of the ice cover is an important characteristic in the study of ice formations. The availability of data on the structure of the ice cover in the winter and spring periods makes it possible to predict the development of ice drift, changes in the strength and thickness of ice. Studies of the ice structure of the Novosibirsk reservoir, the purpose of which was to identify possible changes in ice parameters over time, carried out in the sixties and eighties of the last century [1, 2], as well as observations showed that no characteristic changes in the structure were observed. In early spring, snow lay on the ice. The vertical section shows that the upper layer is cloudy, and below it is transparent ice. The warming effect of solar radiation contributes to the appearance of a layer of water on the ice [1, 4].

The results of measurements of the thickness of the ice cover in the investigated section of the reservoir are shown in table 1.

Table 1 – Results of field measurements of ice thickness and snow depth at the Novosibirsk reservoir in 2020–2021 (near the village of Kirza)

Indicators \ Date	29.11. 2020	06.12. 2020	10.12. 2020	01.01. 2021	28.01. 2021	06.03. 2021
h_{ice} , cm	15.0	25.0	35.0	47.0	70.0	100.0
h_{snow} , cm	2.0	2.0	15.0	100ë	0ë	0ë

Note: Snow depth is unstable. This factor is explained by the presence of strong winds in a large open area.

The data obtained are shown graphically in fig. 3. It also shows the results of measurements performed in 2017 at the same point.

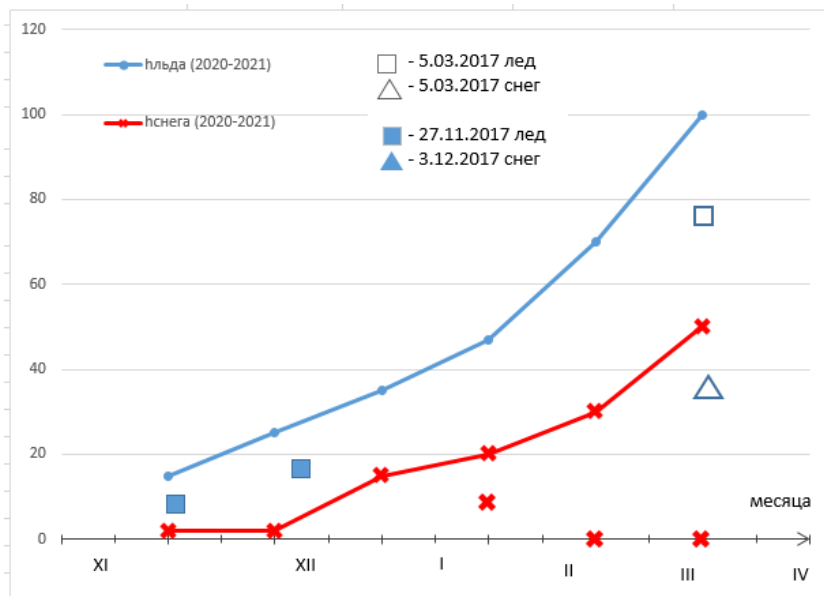
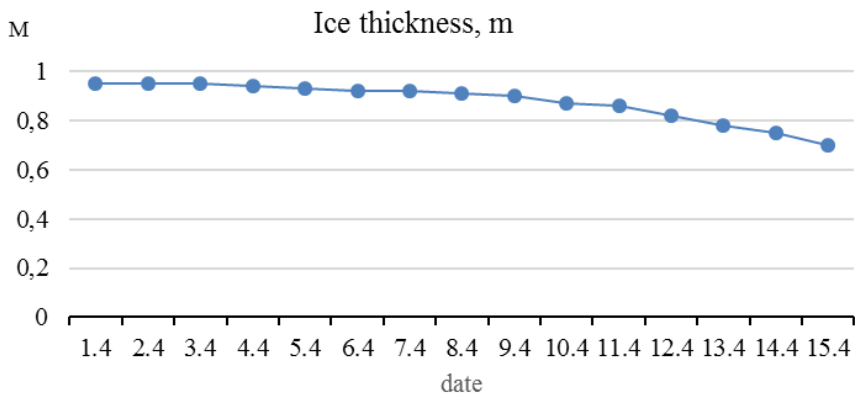
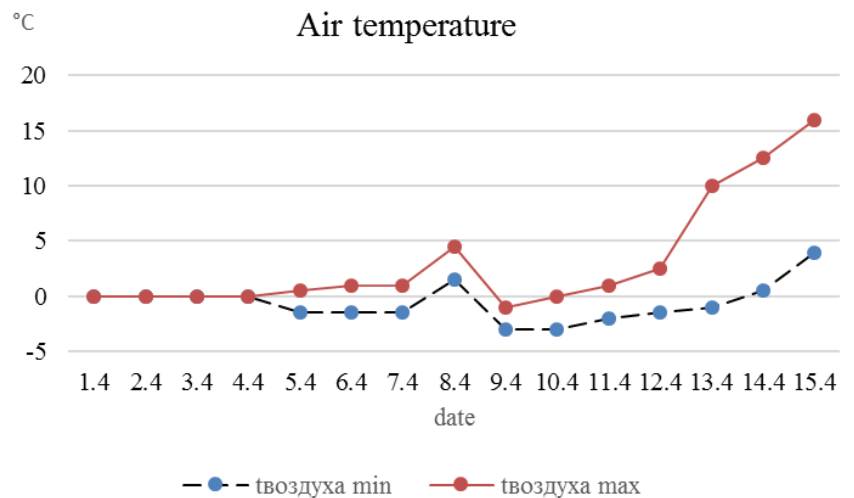


Fig.3. Graphs of changes in the thickness of ice and snow on the Novosibirsk reservoir

Some results of observations of the nature of changes in meteorological conditions, carried out in the study area, can be presented in the following form.

Object	$t_{air}, ^\circ$	$t_{water}, ^\circ C$	Wind speed, m/s
Observations at sea (as of 05.03.2017)	-5.8°	-0.1°	5.0
An island covered with a birch forest (as of 03.05.2017)	-6.6°	–	2.7

Below are the data on measurements of the thickness of the ice cover in the spring, carried out earlier at the Novosibirsk reservoir [3, 5] (fig. 4).



*Fig. 4. Reducing the thickness of the ice cover of the Novosibirsk reservoir
a) air temperature; b) ice thickness*

Conclusions

1. Measurements of the increase in ice thickness in the Novosibirsk reservoir were carried out.
2. Measurements of the height of the snow cover on the ice were carried out.
3. The intensity of the increase in ice thickness on average for the winter period 2020–2021 was 0.87 cm per day.

4. The maximum height of snow on ice by the end of winter 2020–2021 was 50 cm, but it should be noted that there is a significant unevenness in the distribution of snow cover.

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DETERMINATION OF QUALITATIVE CHARACTERISTICS OF WHEAT BREAD WITH PLANTAIN POWDER

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Abstract. *The effect of plantain powder on properties of the finished bakery product is investigated in the article. The organoleptic properties of the control bread sample without using of additives and samples with plantain powder from 3% to 9% were identified. Further, the mass fraction of moisture and acidity of the control sample and wheat bread with plantain powder were determined. As a result, it was found that the additive has an effect on wheat bread and its properties. The optimal dosage is powder in an amount of 3-5% to the total flour.*

Keywords: *bread, functional product, plantain, vegetable raw materials, processing of vegetable raw materials, food industry, technology.*

Introduction

Vegetable raw materials stipulate practical interest as a perspective component for development of functional food products. Therefore, studies aimed at creating new varieties of functional bakery products using non-traditional plant raw materials of South Kazakhstan are of theoretical and practical interest.

Development of a scientifically based technology of bread using functional plantain powder is new issue. Plantain, which grows in South Kazakhstan, is an unconventional plant raw material for bread production.

The purpose of the study is to determine the organoleptic and physicochemical properties of bread in order to clarify the influence of plantain powder on quality indicators of the finished bakery product.

Materials and methods

Experimental studies were carried out in the laboratories of M.Auezov South Kazakhstan University, LLP "Dani nan".

Generally accepted and special physical, chemical, organoleptic methods for studying the properties of finished products have been applied in the study.

In the course of the study, 5 laboratory samples of bread were applied that prepared by batter method from premium flour with the addition of plantain powder in the amount of 3-9% of the total amount of flour.

Results and discussion

Organoleptic analysis permits to determine external qualities of wheat bread. A visual method based on perception of external view and color of an object has been applied for evaluation of appearance of investigated bread samples, as well as the porosity of the crumb.

A tactual method based on perception of smell by means of olfactory organ has been applied for determination elasticity of crumb.

A table with results of study of organoleptic properties of bread with plantain powder is below.

Table 1 – Characteristics of sensory indicators of wheat bread

Indicator	Control sample (without additive)	3% of plantain powder	5% of plantain powder	7% of plantain powder	9% of plantain powder
Form	Rounded, fairly symmet-rical, regular	Rounded, fairly symmetrical, regular	rounded, symmetrical, not drifted apart, without lateral protrusions	rounded, symmetrical with a slightly convex upper crust, without lateral protrusions	round, symmetrical, without cracks and explosions, not drifted apart, has no lateral protrusions
Surface of product	Matt, not burnt, cracks and explosions are absent	Matt, not burnt, cracks and explosions are absent	Matte, without large cracks and explosions, not burnt	Surface is matte, rough, without large cracks and explosions.	Matt, with a slightly convex upper crust
Colour of crust	Golden yellow	Uniform, light brown, not burnt or pale	Brown, uniform	Brown, uniform	Golden brown, without burning

Bread crumb	white color without lumps and traces of undermixing, when pressed, completely restores its original shape	beige	brown with a grayish tinge, baked, not wet to the touch, elastic, after light pressure with fingers takes its original shape	baked, not wet, without lumps and traces of undermixing	brown. The sample crumb is baked, not wet to the touch, elastic, without lumps and traces of undermixing
Porosity	Non-uniform and there are large pores on the cut	More uniform	developed, without emptiness and hardened spots, pores are small, thin-walled	Uniform, small spores, good elasticity, residual deformation is absent	Developed, without emptiness and hardened spots
Taste of bread	savorless, there is no crunch on the teeth when chewing	savorless, there is no crunch on the teeth when chewing	Pleasant, weakly expressed taste of additive	Good elasticity, residual deformation is absent	Sweetish taste
Smell	Pleasant, peculiar to the given kind of product, without outside smells	Pleasant, peculiar to the given kind of product, without outside smells	Pleasant, slightly expressed smell of additive	pleasant taste, without the presence of crunch on the teeth when chewing	Pleasant taste of additive

So, it may be concluded that samples of bread with adding of plantain powder had more intensive colour of crust, mouth-filling taste and aroma due to presence of tannins, organic acids, as well as contained enanth-ethyl and pellargon-ethyl ethers, which have a specific aroma characteristic of plantain powder.

In addition, in products with plantain powder the crumb porosity compare with control sample is smaller, more uniform and thin-walled, without emptiness and

signs of cores in bread (non-loosened areas of the crumb); the color of the crumb is darker - from beige (addition of 3%) to light brown (addition of 5-7%) or brown (with the addition of powder in the amount of 9%); the crumb of fresh bread is soft, well-baked, not sticky and not wet to the touch, elastic, after light pressure with a finger it takes its original shape.

Also, a more intense color of the upper crust, a pleasant light aftertaste and a mild aroma of plantain powder are noted.

It should also be noted that with increasing amount of additives, finished products acquire a sweetish taste, which can be explained by the high content of sugars in ripe fruits - glucose, fructose, sucrose (up to 10.85%).

Determination of physicochemical parameters was carried out 3 hours after the products left the oven and no later than 24 hours, according to requirements for wheat bread made from high-quality flour.

The mass fraction of moisture is an indicator for assessing the quality of finished products. By the mass fraction of moisture in bread, it is possible to judge its energy value. The higher mass fraction of moisture, the lower content of dry substances of bread and the lower its energy value.

High moisture reduces calorie content and deteriorates quality of bread. Bread becomes heavier and less absorbed by the body. Such bread is more quickly exposed to mold, diseases and easily deformed. Low moisture content of bread leads to the fact that it becomes dry, quickly stale, and its taste deteriorates. Moisture content of different products ranges from 34 to 51%.

Mass fraction of bread is determined for calculation its yield and checking correctness of conducting of technological process - accuracy of dosing of basic raw material, flour and water. When mass fraction of moisture of bread is increased for 1%, its yield will rise for 2-3%.

Determination of mass fraction of crumb moisture was carried out by drying out of the sample in a drying oven at definite conditions and expressed in percentage:

Humidity (W) in percentage is calculated by the equation:

$$W = \frac{m_1 - m_2}{m} \cdot 100\% \quad (1)$$

where m_1 - weight of casserole before drying, g;

m_2 — weight of casserole after drying, g;

m — mass of sample, g.

The arithmetic average of results of two parallel determinations is taken as the final result.

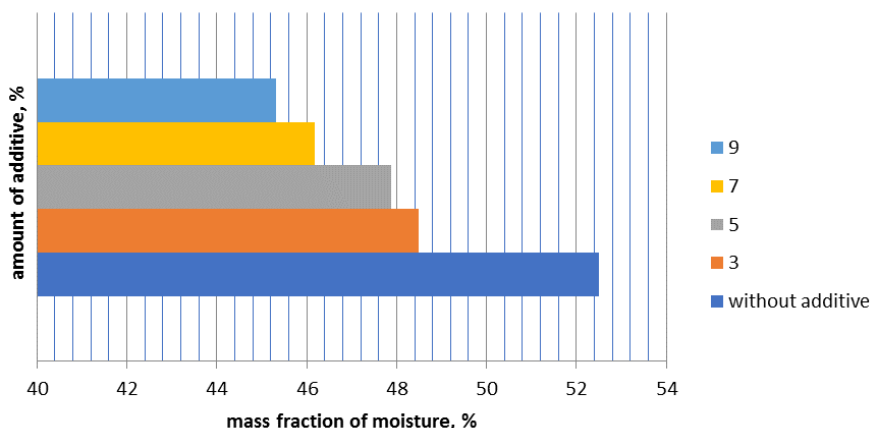


Figure 1 - Mass fraction of bread moisture

Based on the data obtained, a diagram of dependence of moisture content on the amount of applied powder is presented (Fig. 1).

According to Figure 1, it can be seen that with increasing of amount of added plantain powder, the moisture content of the finished products decreases, which permits to make a conclusion about increasing of amount of dry substances, as well as an increasing of energy value of bread.

Acidity of bread was determined in order to assess the correctness of the technological process, also the taste of wheat bread. Acidity of bread is mainly stipulated by products obtained in a result of dough fermentation process. Acidity is expressed in degrees of acidity.

Acidity of flour was calculated by the equation:

$$X = \frac{V \cdot 250 \cdot 100}{25 \cdot 50 \cdot 10} = 2V \quad (2)$$

where: V — volume of 0,1 mol/dm³ alkali solution spent for titration, cm³;

m — weight of bread sample, g;

100 — coefficient for conversion per 100 g of product;

10 — the coefficient for converting 0.1 mol/dm³ of sodium hydroxide solution into 1 mol / dm³ solution.

Based on the data obtained, a diagram of dependence of acidity on amount of added powder is presented (Fig. 2).

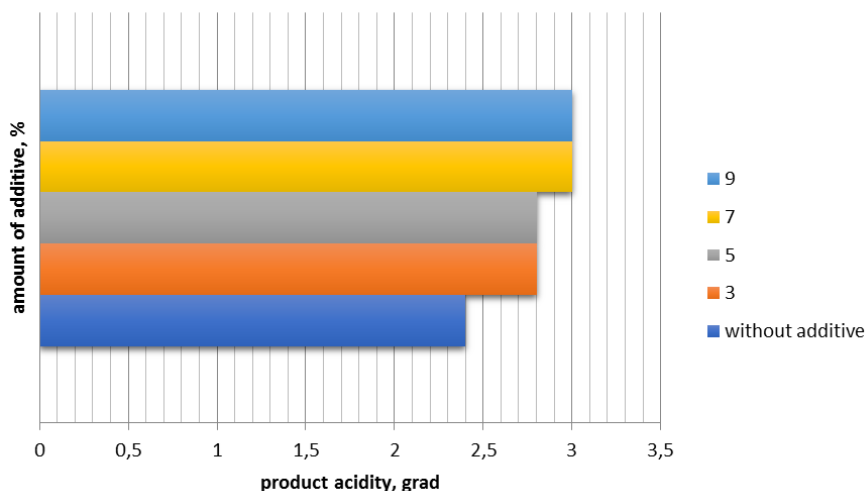


Figure 2 - Bread acidity

It is seen from Figure 2, that with addition of 3% of plantain powder the acidity of finished product increased for 0.2 grad compare to the control sample without additive. When 5% plantain powder is added, the acidity of the finished product also increases by 0.2 degrees compared to the control one. Adding 7 and 9% of plantain powder to the total mass of flour increases the acidity of the bread by 0.4 degrees in comparison with the control sample.

According to the data obtained, it can be concluded that an increase in the amount of added additives increases the acidity of finished products slightly. All the values obtained are within the limits of the norms, the indicator of which should not exceed 3g, for bread made from wheat flour of the highest grade, in accordance with the requirements of the standards.

Conclusion

A study of influence of plantain powder on properties of wheat bread was carried out. Analysis of finished samples of the studied bread showed that bread samples with addition of plantain powder have a more intense color of crusts, a rich taste and aroma. In addition, products with addition of powder have a finer, more uniform and thin-walled crumb porosity, without emptiness and signs of cores in bread. In this case, the crumb acquires a darker color - from beige to light brown or brown. It was also revealed that with increasing of amount of added powder, finished products acquire a sweetish taste.

When studying the effect of plantain powder on physicochemical indicators of quality of finished bread, it was found that with an increase in amount of additive, the moisture content of finished products decreases, which indicates an increase in content of dry substances, as well as an increase in energy value of bread. It was found that acidity index of finished bread also increases with rising of amount of applied powder. This improves the freshness of bread.

According to organoleptic and physicochemical indicators of quality of bread with additives, the optimal doses of plantain powder in the amount of 3-5% to the total mass of flour have been established.

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MODERNIZATION OF RIPPING EQUIPMENT OF BULLDOZER-RIPPER

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Abstract. *The invention proposes a variant of modernization of mounted ripping equipment of bulldozer-ripper by installation of vibration exciter on ripping tooth. A vibrator was selected and a 3D model of a new design was developed. As a result of a numerical study, a decrease in resistance forces arising during soil development was established due to tooth vibration for strong categories of developed soil. This confirms the prospect of using vibration rippers for the development of strong soils.*

Keywords: *loosening equipment, bulldozer-loosener, vibration exciter, loosening tooth, vibrator, development of strong soil.*

Introduction

Modern methods of developing strong soils during the construction of various facilities, often, are produced using bulldozers-rippers. Depending on the category of developed soil, the class of equipment is chosen, the energy saturation of which is sufficient to overcome the resistance forces arising during loosening [1, 2]. However, when carrying out work with heavy-grade equipment, a number of shortcomings arise, which are ultimately displayed on the cost of one hour of operation of the equipment [3]. To reduce the cost of work, it is necessary to resort to bulldozers-rippers of a smaller class, whose operating costs are lower, in comparison with similar heavy-class machines.

One promising way to solve this problem is to install a vibration exciter on the working element of the ripping equipment, which converts part of the energy of the base machine into the vibration energy of the working element. Thus, the structure of the developed soil is decompressed, and due to this, resistance forces arising during loosening are reduced [4].

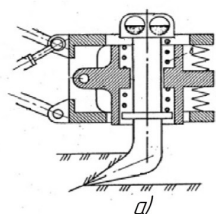
Purpose of the study

The aim of the forthcoming study is to upgrade the loosening equipment of the middle-class bulldozer by installing a vibration exciter on it for the development of strong soils. It is also necessary to carry out preliminary calculations to reduce the resistance force in order to find out the qualitative picture of this effect and to develop a new vibrator design for installation on the tooth of a bulldozer-ripper.

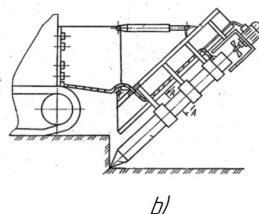
Materials and methods

To select an analogue of the design, a patent and information search was conducted, during which two patents and one study were considered, which proposed designs of dynamic tillers for the development of strong soils (Figure 1).

copyright certificate No. 14.77854 [4]



copyright certificate No. 114.2603 [5]



of the study of the soil tillage process with a vibratory ripper [7]



c)

Figure 1 - Patent and information search: a) copyright certificate No. 1477854 [4]; b) copyright certificate No. 1142603[5]; c) photo of the study of the soil tillage process with a vibratory ripper [6]

The author's certificate No. 1477854 proposes the development of strong soils due to the parametric resonance of the working element [4]. The proposed design is interesting in that due to vibration energy and resonance energy of the working element there is an increase in the volume of the developed soil, however, many movable elements affect the reliability of the structure.

In the author's certificate No. 1142603, the vibration of the working element occurs due to the magnetostrictive effect [5]. The disadvantage of this dynamic ripper is the complexity of the design, the consumption of a large amount of electric energy and the generation of heat, which must be removed by an additional cooling system.

Applying the designs of copyright certificates No. 1477854 and No. 1142603, when modernizing existing structures of hinged rippers, a large amount of money will be required, but this investment will not be justified due to low reliability.

Let us turn to the study "Study of the soil treatment process with vibratory rippling agent" [6]. During this study, the vibration exciter was installed on the soil ripper using the necessary technical solutions that reduce the transfer of vibration energy to the base machine. It was found that due to vibration and pulses of the working elements of the ripper, the traction resistance of tillage machines is reduced, the maximum value of which was 14.38% [6].

Given that the soil ripper is also a soil ripper, the use of this structure on bulldozer rippers can be interesting and promising. In this regard, it is proposed to upgrade the ripping equipment of bulldozer-ripper B-11 by installing a vibration exciter on the ripping tooth.

Results and discussion

For comparative analysis traction calculation of bulldozer-ripper B-11 was performed, on which parallelogram single-tooth ripper of H type is installed [7]. Under operating conditions under known soil properties, traction calculation was carried out in order to determine soil loosening modes.

Determination of total resistance forces arising during loosening was according to formula [1]:

$$\Sigma W = W_f + W_{p,H} \tag{1}$$

where W_f – resistance to movement of the ripper, H; W_p – soil loosening resistance, H.

Based on the obtained study data [6], the value of resistance force reduction was selected in the amount of 10%. The calculated values are shown in Table 1.

Table 1 - Values of resistance forces arising during soil tillage

Soil category	W_f, H	W_p, H	$\Sigma W, H$	$\Sigma W_{vibr., H}$
3	32653,57	16900	49553,57	44598,21
4	32653,57	23400	56053,57	50448,21
5	32653,57	29900	62553,57	56298,21

6	32653,57	54600	87253,57	78528,21
7	32653,57	106600	139253,57	125328,21

The main condition when choosing the technique during soil development is the traction force of the base machine. The total force of resistance to movement should not be more than the traction force developed by the bulldozer-ripper. Calculation of traction force T_N at sufficient engine power, for tracked tractors, was made according to formula [1]:

$$T_N = \varphi_c * G_{tw}, H \tag{2}$$

where φ_c – traction coefficient of propulsor with soil; G_{tw} – traction weight of the tractor, H.

Results of calculation of developed soil category are given in Table 2.

Table 2 - Results of calculation of resistance force difference and bulldozer traction force

Soil category	$\sum W, H$	$\sum W_{vibr.}$	T_N, H	$T_N - \sum W, H$	$T_N - \sum W_{vibr.}, H$
3	49553,57	44598,21	83118,17	33564,60	38519,96
4	56053,57	50448,21	83118,17	27064,60	32669,96
5	62553,57	56298,21	83118,17	20564,60	26819,96
6	87253,57	78528,21	83118,17	-4135,40	4589,96
7	139253,57	125328,21	83118,17	-56135,40	-42210,04

To clearly explain the modernization of hinged ripping equipment, a 3D model was developed that demonstrates one of the possible designs of a vibration ripper (Figure 2).



a) *Figure 2 - Hinged vibration ripper of bulldozer-ripper B-11:*
a) bulldozer-ripper B-11 [8]; b) hinged vibration ripper

Conclusion

As a result of the calculation, a decrease in resistance forces arising during tillage of the soil was established due to vibration of working elements for high categories of developed soil. Thus, it can be seen from Table 2 that the use of a vibrator raises the category of soil under development from 5 to 6. This confirms a qualitative picture of the effect of reducing the resistance force. In order to obtain more accurate data, it is necessary to conduct field tests and it is possible to increase the excitation force.

Based on the calculated data, the relevance of the use of vibration rippers in the development of strong soils is confirmed. Of particular interest for further numerical research is the strength of the ripping tooth of the bulldozer B-11, the design of which should be optimized for safety factor under given operating conditions.

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Scientific publication

**International Scientific Conference
“Science and innovations 2021:
development directions and priorities”**

Melbourne, Australia

May 26, 2021

Signed in print 31.05.2021 г. 60x84/16.
Ed. No. 1. Circulation of 500 copies.
AUSPUBLISHERS, 2021.
Infinity publishing, 2021



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