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workers and other industry experts.

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2. Improving the training of athletes of different qualification.
3. Biomedical Aspects of Physical Education and Sports.
4. Human health, physical rehabilitation and physical recreation.
5. Biomechanical and informational tools and technologies in physical education and sport.
6. Management, psychological-educational, sociological and philosophical aspects of physical education and sport.
7. Historical aspects of the development of physical culture and sports in Ukraine.

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The use of computer technologies at an assessment of sensory-motor reactions in single combats

Abstract. Purpose: to develop a complex of program applications by an assessment of sensory-motor reactions of sportsmen who are engaged in different types of single combats. **Material and Methods:** theoretical analysis and generalization of scientific and methodical literature, method of computer programming. **Results:** the computer program applications by an assessment of sensory-motor reactions of sportsmen-wrestlers are developed and the preliminary approbation of appendices is carried out, their metrological informational content is confirmed. **Conclusions:** during the approbation the received results confirm the data on characteristic values of the level of psychomotor reactions of sportsmen which are available in literature. It allows recommending the developed computer applications for a practical use.

Keywords: sensory-motor reaction, program computer applications, tablet personal computer, single combats.

Introduction. Modern computer technologies open before researchers in the field of sport new opportunities. The improvement of technical characteristics of computers, the reduction of their sizes, the emergence of essentially new devices transfer the dialogue a user to a new level.

The software product also improves with the growth of a technical component. The use of new computer programs with a simple and clear interface allows increasing accuracy and speed of receiving results, and also saves the time at their processing for making decisions [1; 4].

One of new devices which appeared in the last years and deserve attention is a tablet personal computer which is equipped with a touch screen. The use of tablet computers fell within many scope of human life; they found the application for designers, artists, writers, musicians etc. The appeal of a tablet consists first of all in its portability, in good technical characteristics which are coming nearer at the leading producers to the level of desktop computers, and opportunity to communicate with a user via a touch screen.

Having the customized program applications on a tablet, it is possible to expect sufficient efficiency of its use and in the field of sports metrology.

The analysis of the existing appendices testifies to a large number of the programs devoted to sports subject, both an information orientation, and a methodical orientation. But, unfortunately, the specialized programs allowing estimating a psycho-physiological condition of a sportsman are available generally on desktop computers and cost rather much.

As psycho-physiological functions of a person represent a biological basis of separate and typological features of the highest nervous system, they characterize the process of formation and improvement of special skills of the movement in the conditions of the educational and competitive activity. The functional condition of psychophysiological functions can be an indicator as the degree of preparedness of a sportsman and the development of processes of exhaustion and overstrain in it [5; 8; 9].

According to experts [2; 7; 10], on fighting sports where takes place a high intellectual tension where technical and tactical actions are executed with various existential features, and the success of competitive fight depends not only on actions of a sportsman, but also and on actions of a competitor, an assessment of psychomotor indicators allows receiving an additional information on a functional condition of a sportsman for the improvement of a method of its sports preparation.

The above-mentioned confirms a relevance of the development of a complex of statements on the basis of a tablet personal computer for an assessment of sensory-motor reactions of sportsmen, namely, sportsmen who engage in various types of single combats. These appendices will be calculated, first of all, for students and teachers of specialized higher educational institutions in their professional and scientific activity.

The objective of the research: to develop a complex of appendices on an assessment of sensory-motor reactions of sportsmen who are engage in various types of single combats.

The tasks of the research:

1. To make the analysis of special literature on a problem estimates of sensory-motor reactions of sportsmen.
2. To take a complex of tests for sportsmen of single combats.
3. To develop and approve a tablet personal computer application allowing defining the complex of sensory-motor reactions of sportsmen who engage in single combats.

Material and methods of the research. The following methods are used for the solution of objectives: theoretical analysis and generalization of scientific and methodical literature, method of a computer programming.

Results of the research and their discussion. An approximate complex of test tasks is selected, which in our opinion and opinion of experts, is possible to use in single combats, on the basis of studying of special literature on psychophysiological diagnostics [1; 3; 5; 6; 12, etc.] and modern program complexes ("Psychodiagnostics" [4], "A sports psychophysiologicalist" (LLC SMC Analitik, Omsk), the program complex Diagnostician-1 (laboratory of a higher nervous activity of Cherkassy pedagogical university, in the co-authorship with Doctor of Biological Science, professor V. N. Makarenko), etc.).

Test tasks by an assessment both simple and difficult sensory-motor reactions are given below:

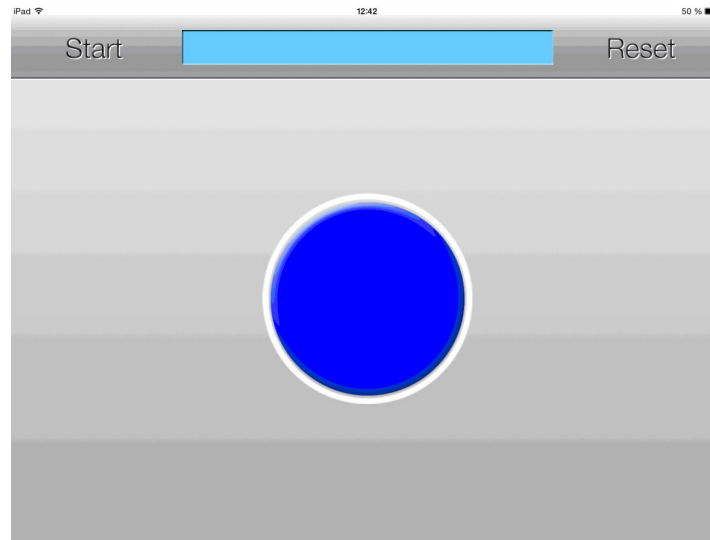
1. Assessment of a motility and simple reaction to a visual signal.
2. Assessment of a simple motive reaction to a visual signal (SVMR).

3. Assessment of a simple acoustical motor reaction (SAMR).
4. An assessment of reaction of a choice among static objects.
5. An assessment of reaction to a moving object (RMO).
6. An assessment of feeling of speed.
7. Assessment of reaction of distinction, reaction to a dynamic object.
8. An assessment of reaction of a choice from two dynamic objects.
9. An assessment of force of nervous system (Tepping-test).
10. A time sense assessment, both with a use of sound intervals, and light.

The program applications including the above-named test tasks are developed in the Swift programming language and calculated on a use on tablet computers with the operating system iOS [13].

The preference to these tablets and the operating system were caused by their speed, reliability, technical characteristics and simplicity of communication with the user.

The interface of all developed programs is simplified and consists of two operating buttons "Start" and "Reset" (pic. 1).

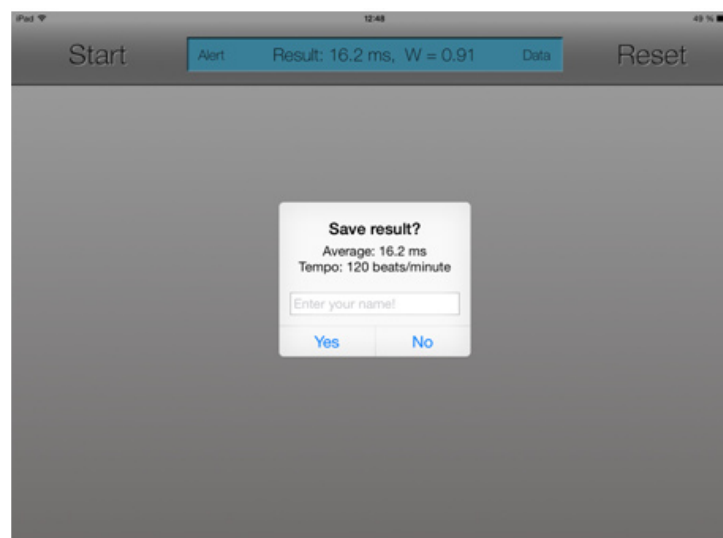


Pic. 1. Interface of a working window of the program for an assessment of a reaction of distinction, reaction to a dynamic object

All tests are developed in one style, and the process of testing is carried out in the automatic mode.

The testing technique practically of all tests includes the offer to the examinee to execute 12 attempts, and after the implementation of the test the program selects 10 best results, calculates an arithmetic average, defines a normality of distribution of the received results according to the criterion of Shapiro-Wilk and, at the compliance of data of the law of normal distribution, suggests to keep result in a database (pic. 2).

At the unsuccessful implementation of the test it is offered to pass it repeatedly. No more than one minute is on average spent for the implementation of the test.



Pic. 2. Window of preservation of the result of the test "An assessment of feeling of speed"

More than 50 sportsmen who are engaged in different types of single combats (fight, taekwondo, karate) having qualification from 1 category to the master of sports of the international class (MSIC), various age (from 16 till 22 years old) took part in a preliminary approbation of the developed applications. As the tested the tablet computer iPad of the 4th generation was used.

Results on some tests (SVMR – simple visual motor reaction, SAMR – simple acoustical motor reaction, RMO – reaction to a moving object) are presented in tab. 1.

Table 1
Results of an assessment of psychomotor reactions, ms

Qualification of sportsmen	SVMR	SAMR	RMO
MS, MSIC	220,9±3,21	197,9±2,35	18,3±0,85
1 category, CMS	251,2±4,81	214,1±4,32	24,7±0,93

Note. SVMR – is a simple visual motor reaction, SAMR – is a simple acoustical motor reaction, RMO – is a reaction to a moving object.

The given results in the tab. 1 and the results received by us according to other tests confirm the data which are available in literature [5; 7; 11] on characteristic values of the level of psychomotor reactions of sportsmen. It allows recommending the developed computer applications for a practical use.

Conclusions:

1. The analysis of special literature confirmed the relevance and the importance of a problem of an assessment of psychomotor reactions at sportsmen, and also defined the directions of improvement of a technique of preparation in single combats taking into account a functional condition of psycho-physiological functions at a sportsman.

2. The test tasks for an assessment of psychomotor reactions of sportsmen of single combats including the tasks according to simple and difficult motor reaction, and also the tasks according to specific perceptions, such as feeling of speed, time sense are selected.

3. The computer program applications by assessment sensory-motor reactions of sportsmen of single combats are developed and the preliminary approbation of appendices is carried out, their metrological informational content is confirmed.

Prospects of further researches. The further research will be directed on an approbation of appendices on tablet computers of other models, the question of transfer of appendices on smartphones and their optimization according to technical capabilities of mobile devices, import and export of databases to cloudy storages with possibility of their further use is also considered.

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Determination of biological age in different periods of human ontogenesis.

Abstract. *The aim:* to determine the parameters of the standardized assessment of biological age and individual characteristics of its occurrence. **Material and methods:** there is analytical generalization of data of scientific literature, clinical anthropometry of the observed contingent, use of sign semantic spaces. **Results:** the estimation of biological age, based on the standardized parameters being the basis of morphological and functional organogenesis, is worked out. **Conclusions:** shows the structure of construction of passport of biological development, that provides the measure similarity of individual development of the relatively set age-related standard.

Keywords: biological age, line of the age-related norms, physical development, ontogenesis of organogenesis.

Introduction. The level of development of organism is determined by the physiological ripening of the morphological and functional systems, reflecting his biological age duration of that in the far of cases does not coincide with chronologic age. For determination of biological age many enough methods are used. It is related to that any morphological and functional systems that came to the maturity undertake in basis of his estimation. Development of the standardized parameters of biological age is extraordinarily important therefore [1, 2, 3].

Reasonable standard determination of biological age will allow in more depth to get to understanding of nature of individual "norm" of physical development and level of physical preparedness in accordance with a project "Innovative approaches to health technology in school physical education."

The aim of the study: is to determine the parameters of the standardized assessment of biological age and individual characteristics of its occurrence.

Material and methods: there is analytical generalization of data of scientific literature, clinical anthropometry of the observed contingent, use of sign semantic spaces.

Results of the study. Among the contingent of certain chronologic age biological age corresponds to chronologic only at those persons that make the mode of distribution of the inspected contingent on the controlled morphological and functional criterion of estimation. Each of such sorts of criteria in relation to specifies the mode on late, normal and passing ahead development on this morphological and functional index. By virtue of that the used morphological and functional criteria of estimation of biological age have the chronologic period of maturity, and then they can be built in the successive temporal row of norms of the biological ripening of the systems of organism. At the synchronous ripening the process of development of all morphological and functional formations of organism can be characterized the measure of delay or passing from his norm. However in every controlled population synchronicity as process, reflecting cooperation of the developing systems, being based on statistical principle of achievement of end-point, has a certain range of variation from the modal value. Exactly this disagreement is the basis of propensities organism to certain nosologies. Sizes such the deviation from the norm of synchronous development, number rejectable in the development of morphological and functional educations, order of ranging of them as far as the looked after deviation from the norm of synchronous development present the symptoms of functional violation of interdependent functional relations told on the change of viability of organism. Totality of constantly meeting symptoms taking into account their character relation on the display of the looked after compatibility in their structure determine syndromes characteristic for certain diseases. Establishment of constancy of relations of symptoms in corresponding syndromes and constancy of their met is made by prodrome of display of morphological and functional violations and come forward basis of preclinical diagnosis. The most difficult period establishment of prodrome is early child's age, that determined by insufficiency of selection of necessary amount of symptoms, or to insufficient exactness of their quantitative measuring for systematization corresponding prodrome of ripening or plan nosologies [4, 5].

The first step in this direction is introduction of additional signs of morphological and functional indexes that is present at birth of child. The indexes of clinical anthropometry behave to such signs, entered M. J. Breitman. Their basis is based on measuring of linear sizes of biokinematics structure of body. In all fifteen indexes are used in measuring entered to them. Order such measuring and location of points of output of necessary sizes presented in a table 1 and on a Figure 1.

To data fifteen anthropometric sizes must add the complete height of body, his weight, specific closeness of body and his volume. At a necessity the deeper working out in detail the amount of the controlled signs it maybe to complement by volume of and weighing each of measurable anthropometric descriptions. With the purpose of exception of distinction of size units of measurable indexes of length of body, weight, closeness, a volume must be presented their testimonies in dimensionless units.

This is achieved at introduction of general criterion of comparison in relation to every group of measurable indexes having identical units. For all anthropometric indexes of linear sizes of body attitude of their length is entered toward length of body. It allows to eliminate the absolute sizes of body and express them in the stakes of unit or in a percentage ratio to length of body, that reflects the quality structure of his structure, that remains identical at permanent met in the synchronously developing structures of body with folded for their constitution of somatotype of the looked after criteria of relation of the compared sizes.

It is like possible to execute these operations for gravimetric and by volume indexes. In this case the quality structure of body will be presented by the amount of the used components, in size the looked after deviations from the accepted standard and by the order of the following of them in the ranged presentation. If to take the type of build at that all morphological and

Table 1

Anthropometric proportions of the human body

% ratio		№	Name	Part of body
women	men			
–	–	I	Upper face	Head neck
–	–	II	Lower face	
10	10	III	Neck	
7	6,23	IV	Acromion-teat distance	Body
14	13,3	V	Teat navel distance	
10	10	VI	Umbilical, inguinal distance	
–	–	VII	Hip	Leg
–	–	VIII	Shin	
–	–	IX	Foot	
9	10	X	Half acromioclavicular distance	Horizontal distance
6	6,3	XI	Half the distance between teat	
14	15	XII	The length of the foot from the heel to the end of the thumb	

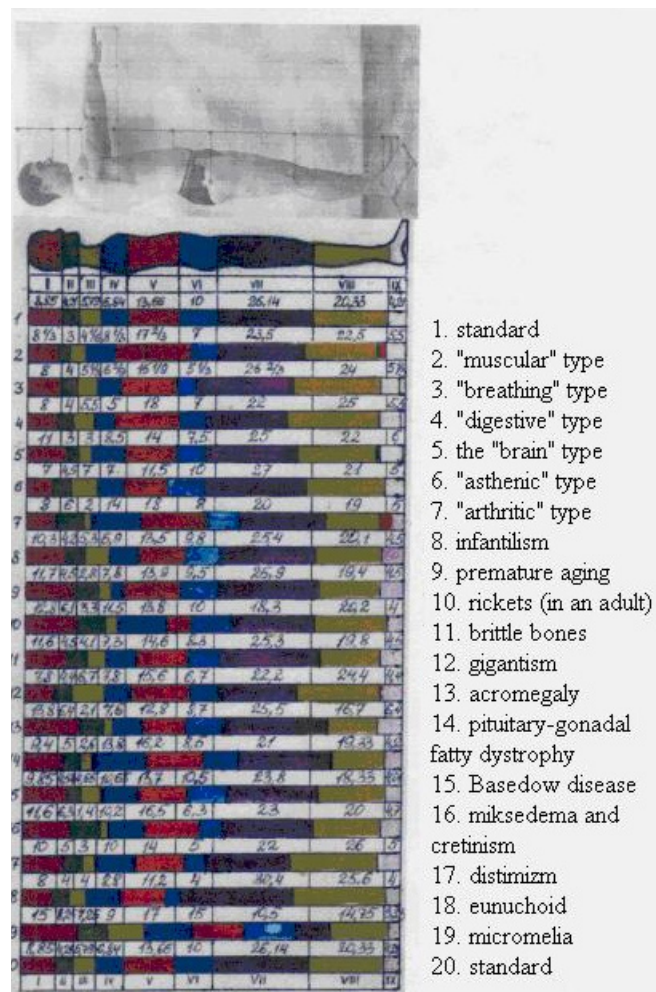


Fig. 1. Quality structure of structure of body of man depending on different correlation of endocrine activity. (In the construction of linear diagrams of somatotype a complete height is taken for unit by consisting of the parts of body, presented in to the relation of length of body. From fifteen descriptions driven to the table 1 on linear diagrams used only nine. (Table 1 and figure 1 taken from the monograph of M. J. Breitman the "Clinical semiotics and differential diagnostics of endocrine diseases").

functional systems in the process of the development correspond to the modal values at, that biological and chronologic age coincides, then his structure shown in dimensionless units, it is possible to use as a standard in relation to that it is necessary to execute comparison of individual biological age at certain chronologic age. Increase of quantity of the compared indexes that characterize the structure of display of biological age of interactive morphological and functional educations requires corresponding space of comparison of their measure of likeness.

Basis of construction such of space is based on that the type of build biological and chronologic age of time of development coincides at that comes forward a standard, here all proportions of the compared descriptions come forward unit of comparison. By a zero border of counting out of the looked after rejections aside hypo or hyper displays of the compared descriptions will come true in relation to a line, passing in the distance unit of relatively initial zero. This line executes the role of zero because in relation to her placing of all looked after rejections that can have the differently directed character are conducted. The most comfortable construction of such sign semantic space is the arctic system of coordinates, in that this line will be presented by the circumference of single radius. In this case any radius a vector expresses the certain used index of biological age, which it is presented on a figure 2.

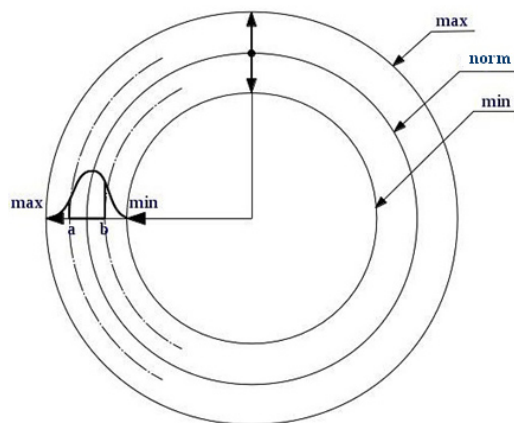


Fig. 2. Circular graph for presentation of passport descriptions of biological age

An external circumference reflects maximally (max) possible deviation from the normal value of the controlled sign; an internal circumference reflects the standard value of the controlled signs and comes forward the index of norm of their display, the radius of this circumference is equal to conditional unit; an internal circumference reflects the border of minimum value of meeting deviation from his standard display in the norm of biological age; the marked zone (a-b) corresponds to the possible vibrations of signs, making functional optimums of the looked after rejections, that reflect operative adaptation providing the no spread function of display of viability arising up in ontogenesis. Talking about the difference of biological age relatively chronologic it is possible only in case that there is synchronous lag or passing ripening of all morphological and functional educations from a norm chronologic and biological age coincides in that. In all other cases it is possible to talk about an allometry and asynchronous of development of different morphological and functional educations with establishment of their ranged row from the latest in development to passing ahead in development, what is the basis of determination of prenosological forecasting of process of developing violations going beyond the zone of operative adaptation functional optimum.

In relation to every measurable sign, the sum of that in dimensionless sizes is equal to unit, it is possible to present the ranged row of elements, in that their order of the following, size of rejection and distance, is set between him. In relation to this order individual logarithmic spirals are built, where the change of the order of structure, related to moving of order or change only of corner between their radiuses, is visible. The structure of such transformations is given in figure 3.

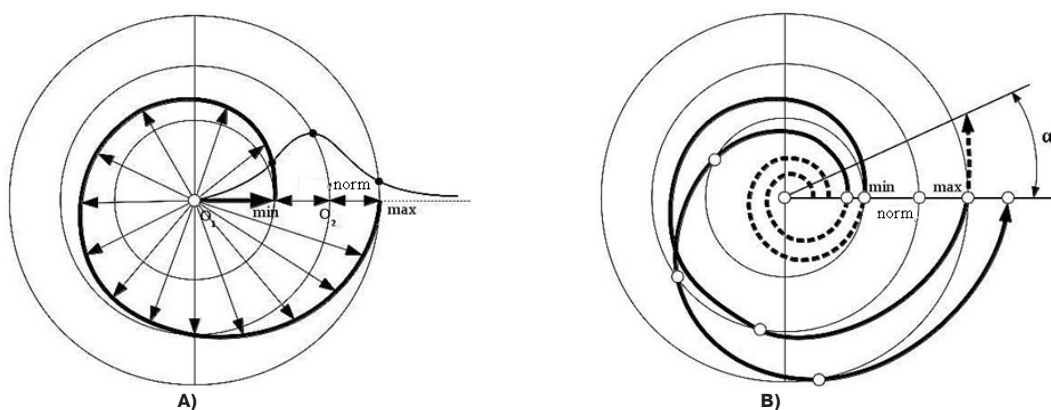


Fig. 3. Presentation of the structure of biological age in the form of ranked distribution of controlled amounts recognized in terms of not having a dimension in the case where there is asynchronous in their morphological and functional maturation

There is a radius of vector on a picture (a) $[O_1; \max]$ corresponds to the complete height and describes an external circumference. In relation to it radius of the vector taken for unit and making in a sum unit of making him components the stake of every anthropometric description is determined. Every stake depending on her size lines up on this vector in the ranged order. By this value as radius a vector is conduct circumferences. Every next circumference has a radius equal to the sum of preceding members of the ranged row. In an interval from a minimum circumference ($R=\min$) to maximal ($R=1$) one coil of logarithmic spiral is conducted. The intersections of circumference with a logarithmic spiral specify the order of structure of distribution of shape-generating parts in the norm of construction of body.

In this case established order following of their sizes of query (coefficients of constancy of relations and constancy of met of these relations) and distribution in the ranged row of signs. In relation to this order the individual placing of the controlled signs is built, that allows to see the changes of order of structure of body (violation of normal order or only displacement of corners between radius vectors of, characterizing signs). Number of the entered signs characterizing the biological ripening of shape-generating body weight in his structural educations it is possible to change descriptions of biological age depending on working out in detail. In a variant (a) curvature of logarithmic spiral of standard and individual description remains permanent, length of her coil changes only from the initial turn of radius ($R=\min$) to the turn of radius ($R=1$).

On a figure (b) the requirement of one coil of spiral, that begins from the minimum value of the controlled sign and ends with a maximal value taking into account their comparing to the standard, is saved in description of individual biological age, but these values lie on one line. Basic descriptions in this case are an order of value of the ranged row and changing curvature of logarithmic spiral.

In the brought presentation over of individual descriptions of biological age the radius of $O_1 O_2$ reflects distance from the first zero that is beginning of counting out, to the second zero, that comes forward the border of sum of component components, reflecting stakes from unit equal to unit. In this case circumference with a radius equal to unit, salient the measure of comparison of component components, presenting the border of their norms, in relation to that as an equilibrium value or beginning of counting out, i.e. zero, the rejections of the controlled sign are marked.

On every radius vector the values of individual data are put aside. When biological age does not coincide with chronologic, position of radius vector can change. For presentation of individual passport of structure of biological age in relation to the vector of $O_1 O_2$ signs are put aside with a minimum and maximal value. In a norm, when relation of biological (B) age and chronologic (X) age coincide i.e. ($B=X$) border of range of min – max is tightened to the zero, that corresponds to the line of norms for every sign. For the location of order of the following of radius vector on a circumference in the ranged value of their stake in the complete sum of unit it is necessary from the end of radius vector with a minimum value that lies on a radius vector of $O_1 O_2$ to the end of vector with a maximal by share value to conduct one coil (360°) of logarithmic spiral. Circumferences are then conducted with a radius vector corresponding to the ranged value in their total stake.

Every intersection of corresponding circumference with a logarithmic spiral determines the location of components in relation to each other. The got construction allows defining the order of met of the folded structural relations in normal biological age (X) figure 3a. Analogical procedure is executed for terms, when biological and chronologic age does not coincide ($B \neq X$) for the components of unit. Such the constructions can be executed in two variants. In relation to a preceding construction the second variant is presented on the picture of 3b.

In the first variant it is necessary on every radius vector in the ranged location on a logarithmic spiral to bring in the individual by share values of the used signs. In accordance with the got result, like a preceding construction there is an individual structure of location of elements of row. At the change of size of by share value of min and max elements, or only one of them the change of location in relation to each other of all elements of row will be regulated, what the order of their following and value of min and max can violate can lie on different radius vector. In this case length of logarithmic spiral can be not equal to the complete turn (360°), which will characterize a certain orientation and character of nosology presentations.

In the second variant it is necessary to save the terms of location of radius vector of min and max of grade value of sign on the line of $O_1 O_2$. It will cause the change of range of variation due to the change of distances between the component elements of row and curvature of logarithmic spiral, but to maintenance fully of one turn (360°). Interpretation of the looked after changes in each of variants of well-organized change of structure of variation row will have the advantages. The feature of construction consists in that in first case the point of O_1 , comes forward beginning of counting out executing role of zero, and in second case the role of zero and beginning of counting out executes a circumference in relation to that all looked after deviations are put aside from a standard.

In any of the used variants will consist the important index of the looked after rejections in the change of closeness of distribution of variants of structure of the folded locations of elements of the ranged row. In one case it description changes in the estimation of lengths of radiuses of vectors, and in other in the goniometry of their turn in a range from the vector of minimum value to the vector with a maximal value. Analogical constructions can be carried out to the rectangular Cartesian system of coordinates, where an exponential line (fig.4) will come forward instead of logarithmic spiral.

The brought diagrams (a, b) over are chosen as examples in that descriptions of parts of body coincided having minimum values bodies (necks) and maximal values of part of body (overhead person). In the Cartesian system of coordinates after a vertical channel the rejection of the controlled signs is put aside in processes to their standard value taken for 100%. On graphic arts the rejections of min and max descriptions are marked only. Sequence of all elements of the ranged row from an arctic diagram not carried.

Presented system of reflection of structure of biological age of individual attributed to the standard that has a coincidence of biological and chronologic age at all controlled morphological and functional educations can broaden on the number of the included indexes and exactness of their measuring. A basic task consists of choice of those descriptions that is accessible for supervision and measuring and in too time, that their presence was observed on all stages of life

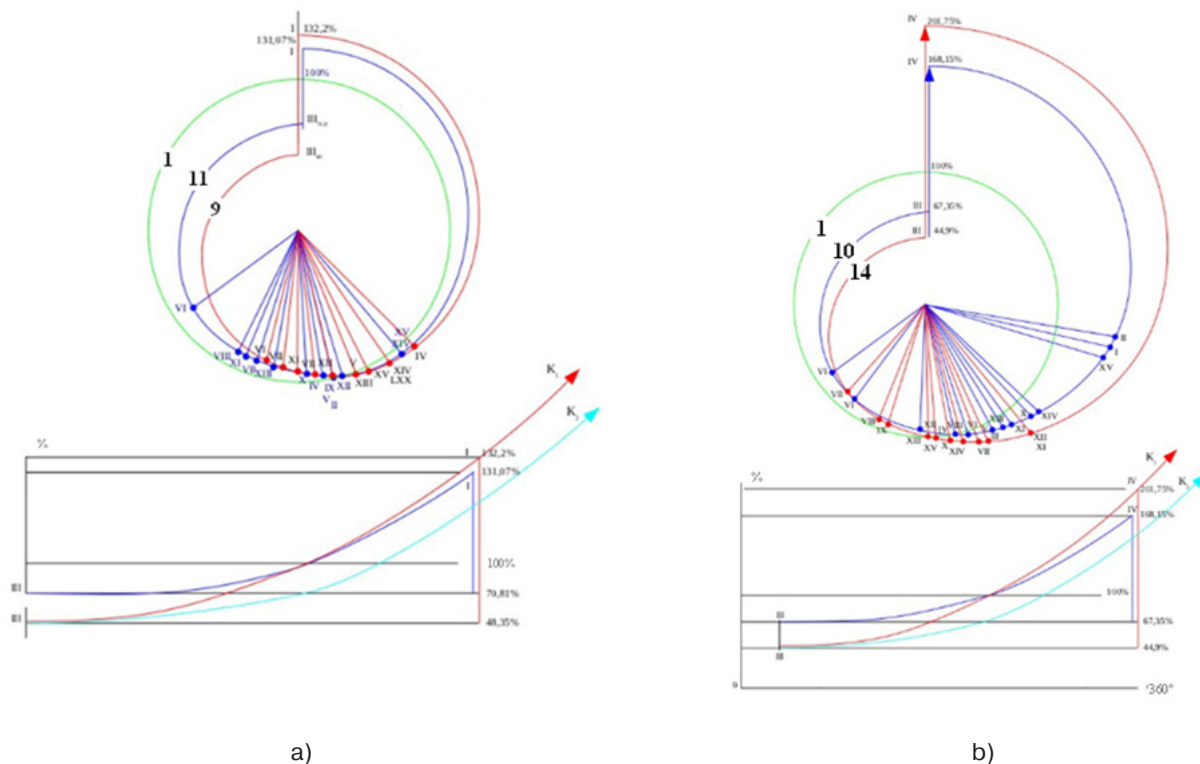


Fig. 4. Presentation of violation of quality structure of structure of body in the arctic and Cartesian system of coordinates for four types of build arising up at different endocrine violations. Data are taken from a figure 1; linear diagram (1,9,10,11,14).

cycle.

Being base on position outspoken Geoffroy-Saint-Hilaire (1836r.), about a necessity for the estimation of process of development to distinguish the height of body and its formation, such indexes as body weight and his anthropometric descriptions were chosen [5]. The height of body is directly related to his weight, by volume of and by the closeness of tissue, and formation reflects the process of organogenesis and his ripening. This position and defined the choice of the controlled descriptions for determination of structure of biological age of developing body. The first index in the estimation of biological age is a bodyweight. In accordance with pointing of H. Lotze (1856yr.) a body is direct space the underlying structure of that stipulates an outward form [6]. Consequently she is the external reflection of character of exchange processes originative her. Deep theoretical ground of it position was considerably later given by M. Y. Breitman (1924r.) that was dependence of by share activity of endocrine cooperation's is set on the change of proportions of body [7]. On the basis of this dependence position was formed them that proportions of body are the external reflection of individual features of flowing of exchange processes. Founded on the base of undertaken studies by him the method of clinical anthropometry was worked out.

On the basis of it the method of clinical anthropometry was chosen for the reflection of the biological ripening of process of body formation reflecting his ontogenesis. On the line of norms of development of body of persons at that biological and chronologic age coincides it is possible to define the sequence of time of the biological ripening of different morphological and functional educations or so-called key line of norms of development of body.

Different speed of development of body and morphological and functional educations generates the process of beating in the interdependence providing to the required volume of trade-out of the masses and speed of their forming. It is reflected in the degree of development of pathology, which is mathematically described as violation of amplitude-frequency modulation at forming of end-point of joint cooperation.

In the process of phylogenesis the mechanism of adaptation, sent to maintenance of norm of interrelated relations of the systems of organism in ontogenesis of their development, was produced. This mechanism allows in set borders to restrain the origin of effect of beating. In the process of ontogenesis base bases of such mechanism suffer the corresponding stages his forming repeating his phylogenesis. This orientation (trend) of this process makes stationary basis, operative adaptation flows on the base of that, providing the correction of interrelated relations of the systems of organism in maintenance of the equilibrium state in the environment of his stay. Facilities used for the directed influence the corrections of trend of mechanism of adaptation possibilities, provided by reserve of operative adaptation there are motive activity and feed. Exactly forming of the motive activity sent to providing of search of feed was the determinative of development of corresponding structure of body in the process of his phylogenesis [8, 9].

In ontogenesis of physical development the necessary is required every stage of his flowing on maintenance, accessible for implementation motive activity and corresponding a feed corresponding to the age-related norm. Deviation from this norm draws disagreement of interdependence relations providing their stability Determination of maintenance of norms of necessary and accessible physical activity for every stage of physical development of organism on the maintenance determined on the basis of population average description of quality and quantitative volume of motive activity making the

norm of corresponding arsenal to biological age of physical development of child's organism.

Determination of quality maintenance of motive activity is important for a purposeful management motion of corresponding parts of body and through them on functional processes providing this activity. Efficiency of this influence explained by that endothelial layer of blood vessels, piercing all organism are an active endocrine organ that is diffusely dissipated on all fabrics of organism and makes 18 kg for the grown man of middle-weight. One of basic functions of endothelia consists in maintenance of the equilibrium state of regulative substances providing integral work of the system of blood supply [10].

Muscular exercises leads to increased circulation of relevant bodies and causes the accelerated development of its vessels, which increases the activity of this part and as a consequence decline in activity of other parts of up to stop their development. In early child's age this effect shows up especially brightly, that determines all importance the use of physical activity with the purpose of electoral influence on flowing of physical development of child.

Analogical meaningfulness for normal physical development and his correction, especially in child's age, has a rational feed because through his quality and quantitative composition it is possible to have influence on the second diffusely dissipated in the different organs of the digestive system of gastro esophageal endocrine system, being the greatest and difficult endocrine organ in the organism of man, qualificatory providing of his trophic processes.

Establishment of the age-related norms of motive activity and feed taking into account the features of biological age remains the most poorly studied area in the question of physical development on the whole and especially in early child's age [11, 12, 13].

Conclusions:

1. Biological age is determined by time of the physiological ripening of morphological and functional educations bound by their organogenesis. In relation to this process there is every system, used for the estimation of biological age can fall behind, pass ahead or coincide in the development with her chronologic age. In synchronous development of process of ripening of the controlled systems it is possible to talk about a corresponding difference between biological and chronologic age. The indexes of development of the systems for the coincidence of biological and chronologic age are used by the standard of comparison for the estimation of individual physical development. In case of the asynchronous flowing of process of the biological ripening of the controlled systems description of biological age has more difficult estimation.

2. The qualificatory index of biological age at asynchronous development of organism is body weight, because in the process of physical development presented by two constituents - height of body weight and her formation in the morphological and functional systems. The observed asynchronous maturation process of organogenesis and of deviation from the standard reflects the individual constitutional predisposition to certain diseases, which is the basis of preclinical diagnosis.

3. Streamline presentation of the ranged values of the lobserved after rejections at the asynchronous ripening of the functional systems, presented in sign semantic space with the entered single measure of the distance shown in the stakes of sigma-mesons or unit allow to set the characteristic features of individual biological age and measure of closeness of his descriptions for different individuals. It provides possibility of forming of homogeneous groups on the level of their physical development taking into account deviations from the norm of physical development and systematization of kinesis facilities for their correction.

4. It provides possibility of forming of homogeneous groups on the level of their physical development taking into account deviations from the norm of physical development and systematization of kinesis facilities for their correction.

Further development of researches in the plan of implementation of project "Innovative approaches to health technology in school physical education." will be related to the construction of the system of facilities of physical activity by adequate to every biological age taking into account the individual features of his flowing.

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Rowing sportswomen motor actions formation

Abstract. Purpose: To study the formation of motor action sportswomen different ages depending on the level of sportsmanship.**Material and methods:** girls which are specialized in a boat-racing in age groups 13-14 years inspected, 15-16 years, 17-18 years, in every group was for 20-25 persons, in all 72 sportswomen. Motive actions were probed on the method of measuring of training effect developed by us an action, and also the functional state was determined by methods: measuring of sensorimotor reaction is on sound and light irritants, speed of current of air, exactness of implementation of the set muscular effort. **Results:** testing showed the dynamics of forming motive, namely technique of mastering of receptions and actions, reliability, presence of errors, efficiency of active voice of consciousness in correct implementation of motion in a biomechanics relation. **Conclusions:** application of this method in the process of sporting preparation will allow to define quality of mastering of technique of the proper motive actions, forming of abilities, subsequent learning and becoming of more difficult motive skills.**Keywords:** boat-racing, functional state, rate, exactness, time of single motion.

Introduction. During sport training necessary motor skills that are the foundation of rational interrelated movements are formed and brought to a certain degree of perfection. To do this, one has to be able to manage relatively simple movements in the main links of the motor system in the formation of a subsequent more complex forms of motor activity, which can be used as means of selective influence on the development of certain physical qualities and abilities [2]. Motor actions features depend on the specifics manifested in their physical qualities and the level of their implementation. Motor skills are generated, updated and changed depending on the degree of physical qualities development [9].

In the course of motor actions development there are certain functional forms of motor control, namely, motor skills and motor skills. If one has any skills is a constant search for adequate ways of doing things. As a result of repetitive motor actions coordination mechanisms are gradually being automated, and that is the main feature of skill, which is characterized by reliable operation, which worsens with fatigue, malaise, and other factors. Skill makes it possible to adapt changing conditions of its implementation to different motor actions, depending on the task and movements technique [6, 7].

Sportsman's skill is largely determined by the motor activity, based on a variety of durable built skills, a large number of which allows for versatile and efficient movements. Implementation of the new motor action takes place on the basis of the necessary minimum of knowledge about his technique, pre-motor experience, and common physical training. In the evolution of motor actions the optimal variant of movement searching takes place under the of consciousness leadership [3]. Movement is not a simple response to the impact of the external environment, but purposeful action, managed during its implementation in cooperation with the external environment and presents an integral structure, differentiating into multiple elements in a wide variety of interaction forms between them [5, 8].

Motion control is carried out at various levels, from the leading cortical, which defines arbitrary actions to background, which governs involuntary movements. In the initial period of complex skills movements development are controlled by cortical systems operating almost independently of proprioceptorics [1]. As a result of the exercises multiple repetitions in their management talamopallidum level is switched on. It is closely connected with tactile organs and proprioceptive sensitivity, movements become more coordinated, accurate, precise, economical, light, plastic. Gradually, the leading role of cortical systems is reduced and coordination of movements management is transferred to the background levels that gradually develop the numerous components of motion, provide the interconnection between them. Various movements are difficult for coordinating, speed, speed and strength. They are caused by various leading and background levels and, consequently, functional management system is formed to every movement [4].

The effectiveness of the movements control is largely determined by sensory corrections, i.e. by changes, made to the movements structure, which are based on feedback [10]. Time, which is required for the operational correction of motor actions varies, depending on many factors. They are technical skills, functional status, the presence of confounding factors, the motor actions complexity, etc. [9].

The work was aimed at studying the motor actions formation of rowing sportswomen's of different age, depending on the sportsmanship level.

Materials and methods of investigations. Female students of the High School of Physical Education and students of Nikolaev Universities were examined, who specialize in rowing, at the age groups of 13-14 years, 15-16 years, 17-18 years. There were 20-25 persons in each group, a total number was 72 sportswomen. The investigation on motor action was held according to a method for measuring the effect of training action (META) pic. 1.

The device of META consisted electronic unit automatic registration of movements, contacting the rod and 2 targets, made in the form of concentric circles that allow to evaluate the accuracy of movements from 1 to 10 on the periphery in the center of the target, which is located at a distance of 30 cm from each other. Research motor actions carried out by fixing the elbow joint working hands on a horizontal surface, and deemed to be fulfilled in contact with the target rod.

Motor actions considered in different circumstances, running consecutively in three time intervals: 15 sec. (n_1), 60 sec. (n_2) and 15 sec. (n_3). Before researched task was: maximum speed and accuracy to perform the predetermined conditions of the experiment movement, especially on the first and last time periods. This formulation of the problem provides an objective evaluation of the tempo, the accuracy of a single movement of time under different conditions: with

fresh forces in the first period of time, during continuous operation in a second time interval, and the third – after a long and a maximum rate of motion for operation.

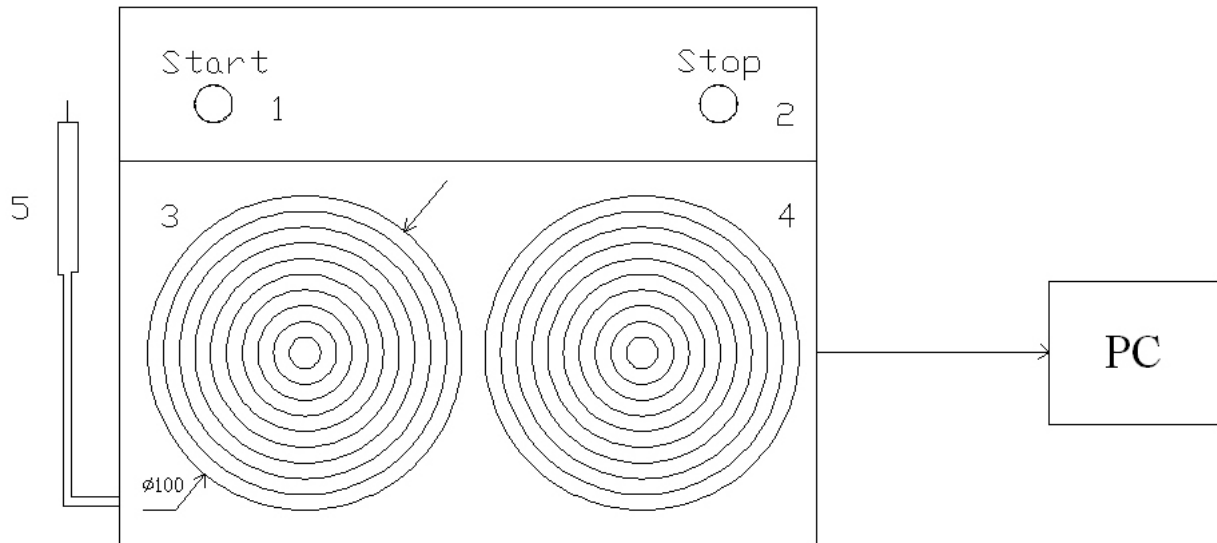


Fig. 1. Schematic of the device measuring the effect of training action (META).
1, 2 – signaling device; 3 – left the target; 4 – the right target; 5 – probe; 6 – a personal computer.

Also functional state of sportswomen was determined with help of techniques: time measurement of sensorimotor responses to auditory and visual stimuli time measurement (EMR – electrical mioreflexometria), the air flow rate (PT – pneumatic tachometry), accuracy of a given muscle force, recorded by dynamometer (DM reversible).

In the course of action, led to motor skill, its most important moments are taken under the consciousness control, in particular, there are three main components in our research, which an sportsman should pay attention to. They are pace, total amount of points, movements accuracy.

The results of research. Following data in the effect of training action measurement in the group 13-14-year-old girls were obtained (Table 1). In the first period the pace of movement was $22,3 \pm 0,993$ blows with the amount of points – $186,6 \pm 8,55$ and the accuracy – $8,41 \pm 0,371$ points, while the maximum values were observed: the pace – 26 blows, the amount of points – 206 with the accuracy of – 9,49 points and minimum ones: the pace – 18 blows, the amount of points – 137 and the accuracy – 6,5 points. In the second period of the test pace was $25,5 \pm 1,456$ blows with the amount of points – $201,75 \pm 3,812$ and the accuracy – $7,94 \pm 0,442$ points, the maximum values correspond to: the pace – 33,75 blows, the amount of points – 217,5, the accuracy – 8,99 points; minimum: the pace – 22 blows, the amount of points – 186,75 and the accuracy – 5,42 points.

In the third period, the effect of training action measurements were determined: the pace – $27,4 \pm 0,61$ blows, the amount of points – $209,5 \pm 8,55$, the accuracy – $7,76 \pm 0,403$ points; maximum values were: the pace – 35 blows, the amount of points – 246, accuracy – 8,77 points; minimum ones: the pace – 22 blows, the amount of points – 177 and the accuracy – 5,53 points.

In three test periods $152 \pm 1,06$ blows were done on average with the amount of points – $1203 \pm 24,2$ and the accuracy – $7,97 \pm 0,39$ points, while there was observed, the maximum result of 196 blows, 1,322 points, 8,71 points, the minimum – 131 blows, 1061 points, 5,85 points, accordingly.

It should be noted that in the second testing period compared to the first one the pace increased on 3 blows, the amount of points on 16, the accuracy of motion was reduced on 0,47 points. In the third period compared to the second one the pace increased on 2 blows, the amount of points on 7, accuracy was reduced on 0,19 points. Pace and amount of points increase is significant, accuracy reduction is located within arithmetic deviation.

The same trend is observed for the maximum and minimum values, but more pronounced for the best result, namely, in the second period compared to the first one the pace increased on 8 blows, the amount of points on 12, the accuracy of motion was reduced on 0,50 points. In the third period, compared with the second one the pace increased on 2 blows, the amount of points on 29, accuracy reduced on 0,22 points.

In reaction time research to a sound stimulus the average value was $0,210 \pm 0,044$ sec, with fluctuations from 0,199 sec to 0,222 sec; to light stimulus – average mark is $0,259 \pm 0,017$ sec, with fluctuations from 0,200 sec to 0,340 sec. The air flow rate was equal on sniff $3,1 \pm 0,161$ l/sec and on exhalation $4,05 \pm 0,062$ l/sec at maximum sniff result 4,1 l/sec and exhale 4,2 l/sec, and the minimum result on sniff 2,8 l/sec and on exhalation 3,7 l/sec. While determining the accuracy of muscle force dosing error was on average $1,6 \pm 0,43$ kg, with a maximum error of 4,0 kg and a minimum 0,66 kg.

The maximum and minimum measures of accuracy in the first period were slightly less than the common average value of this group that did not differ from each other – the maximum amount was 7,92 points and the minimum one was 7,61 points. In the second period at the maximum pace the movements accuracy in the average decreased to 6,44 points, with a minimum pace, that reached 8,48 points. In the third period with a high accuracy pace of movements decreased to 7,02 points, at a low pace rose to 8,04 points. Movements accuracy in three periods at the maximum pace was low (6,74 points), at a minimum pace it was high (8,09 points).

Table 1
Examination results (rowing, female 13-14 years)

Stat. indicators		$\bar{X} \pm m$	\bar{X}_{max}	\bar{X}_{min}	σ	C	
Training action effect measurement	The first period	Pace	22,3±0,993	26	18	2,81	12,59
		Amount	186,6±8,55	206	137	24,21	12,97
		Accuracy	8,41±0,371	9,49	6,5	1,05	12,47
	The second period	Pace	102,5±5,827 (25,5±1,456)	135 (33,75)	88 (22)	16,49	16,09
		Amount	807±15,25 (201,75±3,812)	870 (217,5)	747 (186,75)	43,16	5,34
		Accuracy	7,94±0,442	8,99	5,42	1,25	15,78
	The third period	Pace	27,4±0,61	35	22	4,56	16,64
		Amount	209,5±8,55	246	177	24,2	11,56
		Accuracy	7,76±0,403	8,77	5,53	1,14	14,56
Total	Pace	152±1,06	196 (32,6)	131 (21,8)	22,8	15,00	
	Amount	1203±24,2	1322	1061	68,42	5,72	
	Accuracy	7,97±0,39	8,71	5,85	1,00	12,59	
Tests	EMR	Sound	0,210±0,044	0,222	0,199	0,099	4,70
		Light	0,259±0,017	0,340	0,200	0,049	18,97
	PT	Sniff	3,1±0,161	4,1	2,8	0,456	14,71
		Exhale	4,05±0,062	4,2	3,7	0,175	3,81
	DMrev.	1,6±0,43	4	0,66	1,17	73,25	

Note: There are the data in brackets given to the universal time 15 seconds indicator, in particular 135: 4 = 33,75 blows.

Table 2
Examination results (rowing, female 15-16 years)

Stat. indicators		$\bar{X} \pm m$	\bar{X}_{max}	\bar{X}_{min}	σ	C	
Training action effect measurement	First period	Pace	26±1,253	37	19	5,01	19,26
		Amount	214±9,19	306	174	36,77	17,18
		Accuracy	8,33±0,188	9,56	6,86	0,752	9,03
	Second period	Pace	116±2,23 (29±0,557)	128 (32)	92 (23)	8,91	7,68
		Amount	933±20,6 (233±5,15)	1112 (278)	816 (204)	82,2	8,80
		Accuracy	8,2±0,183	8,79	6,16	0,733	8,93
	Third period	Pace	30,5±1,39	44	24	5,57	18,27
		Amount	232±5,57	254	174	22,3	9,61
		Accuracy	7,79±0,346	9,85	4,88	1,384	17,8
Total	Pace	172±7,52 (28,6±1,253)	244 (40,6)	136 (22,6)	30,11	17,49	
	Amount	1380±27,5 (230±4,583)	1542 (257)	1147 (191)	110,0	7,97	
	Accuracy	8,12±0,196	8,99	6,17	0,785	9,67	
Tests	EMR	Sound	0,198±0,006	0,239	0,152	0,024	12,45
		Light	0,217±0,005	0,247	0,167	0,022	10,31
	PT	Sniff	4,0±0,19	5,2	2,5	0,76	19,0
		Exhale	4,6±0,18	6,0	3,5	0,71	15,43
	DMrev.	1,23±0,268	4	0,16	1,07	86,96	

In the group of 15-16-year-old girls, engaged in rowing (Table 2), when tested in the first period was observed the following: the pace – $26 \pm 1,253$ blows, the amount of points – $214 \pm 9,19$, the accuracy – $8,33 \pm 0,188$ points; at the maximum rates: the pace – 37 blows, the amount of points – 306, the accuracy – 9,56 points; minimum values: the pace – 19 blows, the amount of points – 174, the accuracy – 6,86 points.

In the second period the average values were as follows: the pace – $29 \pm 0,557$ blows, the amount of points – $233 \pm 5,15$, the accuracy – $8,2 \pm 0,183$ points; maximum rates: the pace – 32 blows, the amount of points – 278, the accuracy – 8,79 points and minimum: the pace – 23 blows, the amount of points – 204, the accuracy – 6,16 points.

In the third period, the researchs that determine values were equal to: the pace – $30,5 \pm 1,39$ blows, the amount of points – $232 \pm 5,57$, the accuracy $7,79 \pm 0,346$ – points; maximum rates: the pace – 44 blows, the amount of points – 254, the accuracy – 9,85 points; minimum: the pace – 24 blows, the amount of points – 174, the accuracy – 4,88 points.

On average, three periods were defined: the pace – $28,6 \pm 1,253$ blows, the amount of points – $230 \pm 4,583$, the accuracy – $8,12 \pm 0,196$ points; maximum values: the pace – 40,6 blows, the amount of points – 257, the accuracy – 8,99 points; minimum rates: the pace – 22,6 blows, the amount of points – 191, the accuracy – 6,17 points.

Indicators of sensorimotor reactions to sound were equal to $0,198 \pm 0,006$ sec with a range from 0,152 sec to 0,239 sec; to light – $0,217 \pm 0,005$ sec at the best result of 0,167 seconds and the low – 0,247 sec.

The air flow rate was on sniff $4,0 \pm 0,19$ l/sec, the maximum – 5,2 l/sec, the minimum – 2,5 l/sec; on exhale – $4,6 \pm 0,18$ l/sec, the maximum – 6,0 l/sec, the minimum – 3,5 l/sec.

Error in the reverse dynamometry index was on average $1,23 \pm 0,268$ kg, the best result – 0,16 kg, bad – 4 kg.

When measuring the effect of training action of 17-18-year-old girls following results were obtained (Table 3). In the first period of testing the pace was $27 \pm 1,261$ blows, score – $229 \pm 10,11$, accuracy – $8,66 \pm 0,225$ points, the maximum rates: the pace – 31 blows, the amount of points – 262, the accuracy – 9,55 points, the minimum: the pace – 22 blows, the amount of points – 190, the accuracy – 7,94 points.

In the second period were as follows: the pace – $30 \pm 1,682$ blows, the amount of points – $247 \pm 8,032$, the accuracy – $8,3 \pm 0,227$ points; the maximum pace – 37 blows, the amount of points – 271, the accuracy – 8,78 points; minimum pace – 25 blows, the amount of points – 213, the accuracy – 7,16 points.

Table 3
Examination results (rowing, female 17-18 years)

Stat. indicators		$\bar{X} \pm m$	\bar{X}_{max}	\bar{X}_{min}	σ	C	
Training action effect measurement	First period	Pace	$27 \pm 1,261$	31	22	3,33	12,35
		Amount	$229 \pm 10,11$	262	190	26,7	11,6
		Accuracy	$8,66 \pm 0,22$	9,55	7,94	0,596	6,88
	Second period	Pace	$120 \pm 6,73$ ($30 \pm 1,682$)	148 (37)	100 (25)	17,77	14,94
		Amount	$988 \pm 32,13$ ($247 \pm 8,032$)	10814 (271)	852 (213)	84,81	8,59
		Accuracy	$8,3 \pm 0,227$	8,78	7,16	0,6	7,22
	Third period	Pace	$31,8 \pm 1,261$	36	27	3,33	10,48
		Amount	$252 \pm 11,92$	294	209	31,48	12,59
		Accuracy	$7,9 \pm 0,504$	9,41	5,81	1,33	16,88
Total	Pace	$178 \pm 6,17$ ($29,6 \pm 1,02$)	217 (36,2)	173 (28,8)	16,29	9,16	
	Amount	$1470 \pm 35,49$ ($245 \pm 5,915$)	1640 (273)	1251 (209)	93,70	6,38	
	Accuracy	$8,32 \pm 0,264$	8,94	7,06	0,696	8,36	
Tests	EMR	Sound	$0,186 \pm 0,005$	0,198	0,159	0,014	7,53
		Light	$0,203 \pm 0,011$	0,248	0,165	0,030	15,3
	PT	Sniff	$4,83 \pm 0,224$	5,6	4,0	0,592	12,26
		Exhale	$4,99 \pm 0,211$	5,8	4,3	0,556	11,13
	DMrev.	$1,0 \pm 0,163$	1,66	0,5	0,429	42,96	

In the third period were determined: the pace – $31,8 \pm 1,261$ blows, the amount of points – $252 \pm 11,92$, the accuracy – $7,9 \pm 0,504$ points, the maximum pace – 36 blows, the amount of points – 294, the accuracy – 9,41 points, minimum pace – 27 blows, the amount of points – 209, the accuracy – 5,81 points.

Summery measures for the three test periods were: the pace – $29,6 \pm 1,02$ blows, the amount of points – $245 \pm 5,915$, the accuracy – $8,32 \pm 0,264$ points at the maximum rates: the pace – 36 blows, the amount of points – 273, the accuracy – 8,94 points and the minimum: the pace – 28,8 blows, the amount of points – 209, the accuracy – 7,06 points.

In studying reaction with the help of electrical mioreflexometer to sound compared with the average value of $0,186 \pm 0,005$

sec, the minimum value was 0,159 sec, i.e. on 0,027 sec less and maximum 0,198 sec, i.e. on 0,012 seconds more. Sensorimotor reaction to light was on average $0,203 \pm 0,011$ sec, the minimum time of 0,165 sec, i.e. on 0,038 sec less than the average and maximum time of 0,248 sec, i.e. on 0,045 sec more than the average value. The pneumotachometry index was on sniff $4,83 \pm 0,224$ l/sec and on exhale $4,99 \pm 0,211$ l/sec, respectively the best score was 5,6 l/sec and 5,8 l/sec and the lowest one 4,0 l/sec and 4,3 l/sec. The error in the determination of dosed muscle force on average was equal to $1,0 \pm 0,163$ kg with a maximum value and a minimum one 1,66 kg 0,5 kg.

In the group of 13-14 year-old girls, engaged in rowing, when measuring the effect of training actions compared with the first period occurred during the second period of increase in the pace on 3,2 blows, the amount of points on 15,15 with a decrease in the accuracy on 0,47 points. In the third period, the pace increases more (on 5,1 blows) and the amount of points on 22,9, but the accuracy was reduced on 0,65 points; in this period as compared to the second one the pace and the score rises slightly, on 1,9 blows and 7,75 points, the accuracy decreases on 0,18 points, i.e. the studied parameters in the second and the third periods were almost at the same level.

At the maximum amount of pace and amount of points accuracy rate compared with the first period decreased in the second on 1,48 points, in the third on 0,9 points; for minimum values in the second period accuracy increased on 0,56 points, in the third – on 0,43 points.

In the group of girls at the age 15-16 compared to the first period the movements precise in the second period fell within the statistical error on 0,19 points, and the third on 0,163 points. At the maximum pace and the amount of points compared with the first period in the second period, the accuracy is improved on 0,48 points, while the third has decreased on 2,43 points. With minimum terms of pace and amount of points compared with the same accuracy in the second period decreased on 0,29 points, and the third on 1,9 points.

In the group of girls at the age of 17-18 years in the test measuring the effect of training action precise movements was almost identical to the average values with a difference 0,17-0,56 points in the second and third periods as compared to the first one. At the maximum pace and the amount of points accuracy decreased in the second period on 1,13 points, in the third one on 0,29 points. With minimum pace and the rate amount change of points have exactly the same trend. It is a decrease in the second period on 0,11 points, and in the third on 0,89 points.

Research of reaction time to the sound showed a sufficiently high level in the group of 13-14 years, which was then increased in the group of 15-16 years on 0,012 sec and in the group of 17-18 years on 0,024 sec compared to the younger group. The same trend was observed in the determination of the sensorimotor response to light stimulus – corresponding increase on 0,042 sec and 0,056 sec.

The air flow rate characterizing the physical development and functional status, was at the average level, which was specific to girls, that do not go in for sport and, of course, increased with age. Compared with the younger group of 13-14-year-olds, in the group of 15-16-year-olds the air flow rate increased during sniff and exhale, respectively on 0,9 l/sec and 0,55 l/sec and 17-18 years – on 1,73 l/sec and 1,89 l/sec.

Error detection dosed muscle force showed high accuracy of the task in 13-14 years, 15-16 years, the error decreased on 0,37 kg and 17-18 years – 0,6 kg.

Investigating the effect of training action shows that sportswomen in all age groups maintain the pace throughout the test, which increases slightly with each period approximately almost equally, but the initial level in the older age groups is more on 4-5 blows or 18-22%. The amount of points is increased in the same dynamics – 32-46 or 15-22%. However, the accuracy is almost at the same level with the trend of increase in the older group compared to younger on 0,25 points in the first period, on 0,36 points in the second and on 0,11 points in the third and the average for the three periods on 0,35 points.

In our research, testing shows the dynamics of the formation of motor skills, particularly the form of the techniques and actions development, reliability, errors, the effectiveness of the active consciousness participation in the proper execution of movements in biomechanical terms, in which the motor is controlled by the lower parts of the automated parts of the CNS, and notional – by higher ones. It contributes to the primary motor task in definite conditions, the choice and use of the most efficient methods for its solution, i.e. the effective functioning of higher mechanisms of motor control provision.

Conclusions. Test of measuring the training actions effect characterizes formation of motor actions in terms of reliability, variability and ability to achieve generated traffic goals.

The use of this technique in the process of sport training will allow to determine the quality of the technology relevant motor actions development, the formation of skills, which are a prerequisite for the developing of next studying and the subsequent formation of more complex motor skills exercises.

Testing results show the presence of the prerequisites for effective technical improvement, development of the ability for creative thinking, analysis of operated movements, specialized perception improvement.

Prospects for further research. The research with help of proposed methods of motor actions mechanisms formation under the influence of complicating factors (excitation, fatigue, changes in environmental conditions, and others.) will be held in order to create a comprehensive methodology for assessing the prospects of sportsmen in a particular kind of sport.

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Calendar of holding sports competitions as a source in study of features of development of domestic sport in the 30s of the XXth century

Abstract. Purpose: Based on the analysis of a number of archive documents made an attempt to investigate the dynamics of development of Olympic and non-Olympic sports in the first decades of the Soviet period of the Ukrainian history. **Materials and methods:** The analysis and generalization of sources on the subject. **Results:** The features of the development of sports industry of the USSR in the 30-ies of 20th century are analyzed. **Conclusion:** it is proved, that the development of the sports field was caused by primarily political factors; equal attention was paid to Olympic and non-Olympic kinds of sports.

Keywords: kinds of sport, calendar of sport events, sports chart, sporting competitions, sportsmen.

Problem statement. Research of becoming and development of domestic twenty-four hours in the last years becomes more popular. The crisis phenomena that inherent to all spheres of modern Ukrainian society, did not go round a side of athletic-sporting industry of our state. During overcoming of difficulties, caused by a difficult socio-economic and military-political situation in this country, we once again turn to experience of past generations which are forced to overcome the number of problems for the sake of reformation of domestic sport. The account of errors credible incidents which took place in the 30s of the XXth century, will allow to economize resources for more swift and effective updating of sports area of modern Ukraine.

Thus a retrospective study of becoming and development of domestic sport in soviet times is original empiric foundation on which will be erected new building which must answer the necessities of present time.

Illumination of process of installation of sport inherited for researches of soviet period underline attention to the questions of management, marking, sporting activity of sporting achievements of the Ukrainian sportsmen [2,4]. Modern researchers try to reconsider the historical legacy of soviet period [1,3,5].

Connection of the research with scientific programs, plans, themes. The paper is done within the research project "Theoretical and methodological characteristics of the development of non-Olympic sports."

The aim of this research is an attempt to characterize the dynamics of Olympic and non-Olympic kinds of sports in the USSR in the 30-ies of 20th century.

Materials and research methods. Among the variety of dissertations, monographs and scientific articles devoted to this problem, the special place belongs to the archived materials the analysis of which allows to educe the real format of historical events of the past [6]. Exactly, the archived documents come forward as a primary base of any research. Application of analytical in general lines, logical, empiric methods allows not simply to feel the atmosphere of time, but also realize the narration of phenomena which became history.

The use of analysis of content makes scientific labour maximally narrative, clear and realized.

From between the large array of funds of the Central archive state public associations of Ukraine (farther - ЦДАГО), a main place is occupied by party documents, as plans, decisions, reports, and the like, leading structural subdivisions which took care for physical culture and sport. Then planning activity regardless to the high degree of formalization, contains very valuable information which touches the dynamics of functioning of physical culture and sport in Ukraine in the 30s.

For realization of dynamics of preparation and exposure of sporting abilities and skills of the Ukrainian sportsmen, achieved for the twentieth birthday of bolshevist domination, it is worth to analyse the calendar of sporting events for 1937.

Results of the research and their discussion. Structurally the calendar of sporting events (farther for comfort - KCZ) contains information about the sports, form, time and place of conducting of competitions, and so on [6, p. 24–29.]. The calendar register of sports in this document is structured not after alphabetical but on the priority principle. Such hierarchy allows to define the degree of importance of sporting directions that cultivated in USSR and in URSR in the 30s.

The specificity of realization of sporting measures was based on spatially-calendar basis, embracing by itself terrain and aquatic space. Airsports now among civil competitions in this document are not marked. Character of competitions and relay races, by plan of their organizers could reveal the maximal amount of talented sportsmen in the condition of achievement of high results by them.

Calendar factor varied within the limits of March - December of current year. It means that a sporting year began at early spring and closed at the beginning of the winter. In the set interval of time organizers tried to include all possible types of control of physical possibilities of sportsmen, regardless of varieties of kinds of sport.

A gymnastics stood on the first place. Exactly in the USSR in 30s - considered a sport queen. And not surprisingly. In fact physical drills demonstrate corporal perfection. The rightness of their implementation needs coordination of work of all groups of muscles which are the guarantee of correct development of all organism.

A spring heat allowed to organize and conduct a competition on outside court. However it should be noted that gymnastics is only one from all list marked in KCZ December type of sport.

In April - May individual- team championship revealed the champions of cities and areas. Summer period foresaw realization of mass-sporting gymfests within the limits of cities and districts. Finally, late autumn republican competitions

were planned, what completed trade-union championship of all-union scale.

On the second place was swimming stood in a sporting register. Besides overcoming of aquatic obstacles, this sport was complemented by diving and water-polo. To the competitions cities were brought over where swimming pools were: Kyiv, Kharkiv, Dnipropetrovsk. It is not difficult to guess that teams of these cities were the strongest due to a corresponding infrastructure. As a rule exactly, they presented a republic on the inter-republican and all-union competitions. For the swimmers of rural and district scale the open reservoirs were used in daylight for saving time of an year. Republican competitions in watersports that years took place in Dnipropetrovsk. Obviously the annual rotary was existed of accepting city which physically could provide sportsmen with necessary sports buildings. All-union championship was held at the end of July in Moscow. Inter-republican competitions - at the end of autumn in Leningrad.

Followings on a calendar are kinds of competitions which allow to unite them in the power sports. They were: boxing, wrestling and weightlifting. Traditional monthly limbering-up of boxers and wrestlers- championship of cities and USSR, later on the all-union championship in Moscow. By the way, during all-union competitions in boxing of 1937 in feather-weight (57 kg) the gold was won by a youth from Kharkiv, student of Institute of sports Anatolii Greiner (1916 - 1990).

Attention was paid to the name of the third power type of sport. In KCZ weight lifting is considered as a "barbell", although as seen this type of sport foresaw a competition only of weighters, but not weight-lifters. Thus unlike boxing and wrestling, competitions in a barbell lifting were less protracted. Obviously force and skill the weight-lifters cultivated throughout a year.

Fencing, unlike the previous kind of sport of that year did not foresee all-union competitions and carried especially regional character.

The cycle racing in those times had the name bicycle. Cycling races lasted almost a whole year. Evidently such method of movement was claimed. Cycling competitions began from middle of March and lasted to the end of September. On an initial phase (in spring) they were held for the lines of GTO, later carried administrative-territorial character within the limits of UKRAINE. In summer were all-union competitions. In autumn was all-Ukrainian championship. A "bicycle", as a type of sport, included for itself cycling races, cycling cross, and also track and a figure ride. Regarding to the small numbers of cycle tracks regional and republican championship took place in Kyiv, Kharkiv, Odesa, Dnipropetrovsk and on Donbas.

A next step in a sporting pantheon was occupied by track-and-field. For soviet authorities it was personification of run, that is why this sport was brought over as many as possible participants. Next to regional, the military men heats took place for the lines of GTO and BGTO.

The running relay races of cities and areas were completed by all-republican championship in Kharkiv. All-union competitions were traditionally held in Moscow. It is worth to pay attention to ideological colouring of track-and-field events. After the completion of all important competitions, the September heats were settled down in honour state holidays and party leaders. Thus every participant of heat subconsciously showed respect to the soviet system and its leaders doing the contribution in building up the radiant future.

The games sports at that time were presented by football, handball, tennis, gorodki, volley-ball, basket-ball and rugby. Actually, exactly in such sequence they are transferred in KCZ. Most respected among them was certainly football which in KCZ considerably more attention was paid than to others. Considerable attention was paid to the sports staff. During March - April trainers passed the two-month skill improvement courses. By the way, the same measures (but for masters of sport and judges) were taken in relation to track-and-field athletics. Thus, these two types of sport, unlike others foresaw permanent further qualification training and improvement of qualification for coaches and judges.

During qualifying games in football the Olympic system was used which foresaw bringing in of wider range of soccer teams of different level. Absence of such approach to other sports did football by more Olympic kind of sports competitions.

Next was the summer republican championship held by round robin. Cup-tie of the USSR was held from May, 24 up to June 30 in 1937. August-September was devoted to all-union championship for determination of the strongest team of Soviet Union. That year Moscow "Dynamo" became the first, and Kyiv "Dynamo" took the third place. Thus, football from the amateur sport, during one short season was transformed into professional or, at least, semi-professional.

Competition in handball, gorodki, volley-ball, unlike basket-ball and rugby did not have all-union meaning. Routine competitions at the level of cities and areas were ended with republican championship in Kyiv. Thus in organization of volleyball events the paralogism of realization of games was, to some reason, noted. The March-April championship of Ukraine, even at the level of public organizations and labour collectives outgrew in summer championship of cities.

The competitions in tennis, basket-ball and rugby took place on a fully logical administratively-regional chart, by the final stage were the all-union competitions. Only one feature: all-union championship in tennis was individual and not team.

Relay races were also considered regional in rowing and sailing, which got the name "rowing-sail". Beginning in July championships of cities, competitions had the intermediate trade-union stage which passed over to the September all-Ukrainian championship.

The individual sports included equestrian, auto-motorcycling and also chess and checkers. Pretty queerly combination of physical and intellectual varieties of sporting competitions in KCZ was given exactly in such sequence. Meanwhile, equestrian races kept limits of an area and were held in those cities where hippodromes were relocated. Relay races in auto-moto events were more various. For their realization existing roads were used and motorways, that saved money, but created inconveniences for the civil participants of traffic.

This type of competitions began in a middle of Spring and lasted up to the middle of Autumn. Auto-moto included: motor races, motor cycle races, car races of championship of cities, auto clubs, republican and all-union auto competitions. Notable is that all forms of auto-competitions were completed by the militarized autumn cross-country auto race (probably devoted to the anniversary of October revolution) during military parades in the cities of Ukraine, and winners - on the Red square in Moscow. It is worth to pay attention, that regardless considerable financially-organizational expenses on realization of competitions, auto-moto among the technical sports was paid maximal attention to. You can add to it the

service of motor mechanics, cost of gas and oil materials, spare parts, logistics in providing of racing motorists' needs. Obviously reason that is a militarist constituent of auto-motorcycling, in fact, in the case of war rapid re-deployment of manpower and technique is possible on a condition of presence of specialists in extreme driving of technical means. In this context we can compare inexpressive competitions in equestrian sport and bright enough of auto-moto. Evidently soviet authorities in the conditions of the expected war considered the Artiodactyla means as archaic, as compared to "ferrous horse" equipped by the supermodern types of fire-arms.

Next to aspiring to physical perfection of workers and peasants, attention was paid in Ukraine to intellectuals as well. This function in a sporting area was performed by chess and checkers. Schools of soviet chess-players had not yet been formed in that time and that is why this sport carried an amateur character. In chess and checkers were played by both men and women. The selection of the best was held on a standard chart: at first qualifying rounds within the limits of the union republics, afterwards there was a republican final, then an all-union tournament. At that an all-union tournament was conducted also among women, demonstrating by that of gender equality declared by soviet ideology.

A hunting belonged to the individual sport. Holding of regional and all-union competitions took place within the limits of hunting-season but in summer and fall seasons. Ability of well-aimed shooting was combined with skills of training of fore-paw friends, that is why alongside with firing the all-union exhibitions were conducted in dog-breeding. Plugging of hunting in the list of sporting competitions was not casual. A man with a gun in a peace-time perfects the abilities. For human a hunting is a hobby. In the case of beginning of war the skilful marksmen and dog-breeders are transformed to the rank of the most claimed specialists from the cohort of the mobilized.

In summer the all-round competitions were conducted in the context of verification of base physical skills of citizens who are "ready to labour and defense". As it is known the all-round complex GTO was included to all-union sporting classification. The summer and winter events existed which presented the complex system of body-conditioning which the wide strata of population were attracted to. Beginning from 1931 in the USSR annual competitions were held on both regional and all-union scale. Namely in 1937 the summer program of GTO was planned in UKRAINE. The end of the 30s summarized the first soviet sporting six-year plan. It is evident now that competitions in these events of sports were conducted at first among the most skilful persons who showed the greatest results in days gone by. Individual and team championship of badge-holders of 1-st ranking of voluntarily societies and physical culturists fluently passed into regional and all-ukrainian competitions for the badges of 2-nd ranking of GTO.

Amateur competitions became the final part of KCZ in 1937. Rural sport stood on the first place. Regarding that collective farmers were busy, timely and physical impossibility to take up the systematic trainings, and accordingly to go in for sports professionally; for them there were the planned competitions in all-round. Interesting is the fact that the collective farm competitions were conducted at once at the republican level. The winners of a collective farm sporting games of Ukraine could participate all-union spartakiad meet in all-round and sporting games.

It should be noted that bringing peasants in sporting activity created certain discomfort in their lives. They were to be distracted from agricultural works, got permission and money from the chairmen of collective farms for participating in competitions. That is why archives are abound in numerous queries, in relation to transference of competitions and forbid to use agrarian workers for training sessions and competitions and the like.

The last step of final part of KCZ belongs to spartakiad meets among the students of schools and universities. What concerns schoolboys is that the compilers of calendar paid attention only to town schools. After conducting of town contents winners rode to all-ukrainian spartakiad meet. Obviously such measures took place in a vacation period which meanwhile for somebody was delayed to September. You can see that in spite of certain indignation of children and parents, in relation to absorption of vacations by going in for sports, such approach allowed to reveal the most talented young people, create sporting reserve and form the professional orientation for the young generation.

Interinstitution competitions, unlike school ones had a certain specificity. Students presented not secondary schools but public committees (that time ministries) the departments of which they belong to. It provided more high-quality financing and provision of juniors a sporting inventory.

In July relay races among public committees in gymnastics, that traditionally held in Moscow came forward as final and at the same time were chronologically middle part of sporting activities foreseen for 1937.

An eventual phase were the September university games in which students-sportsmen defended honour of own alma mater.

Vacation time for sporting trials was rationally planned taking into account beginning of academic year where no measures in the sphere of physical culture and sport were not planned.

Without regard to certain failures and hard centralism during creation of all-union and regional sport in Ukraine and USSR in an intermilitary period, party authorities put considerable efforts with the purpose of realization of principle of healthy way of life in all strata of society. The obtained experience will be used in the further years of soviet history. Exactly, this factor allowed to apply the number of standard charts in education of sportsmen, their aspiring to victory in sports competitions.

Conclusions and the prospects for further research. Summing up the conducted research it is worth to say that a process of realization of sports measures in Ukraine at the state of the end of the 30s had clear and careful thought out of organizational and logical structure. The heads of the sports and physical culture industry when planning KCZ tried to take into account the maximum amount of human and objective factors, which concerned the sportsmen, kinds of sports and specificity of their holding. Regardless to a financial deficit, bad infrastructure, certain social indifference, the soviet party bodies considered sport to be the important mean of education, ideological influence on society and effective form of forming of reserve of Red Army. Next to classic kinds, there developed the artificially created non-olympic sports, which were of mass character somewhere. For sports authorities that was not important. Nevertheless in that time neither the USSR nor none of soviet republics took part in official international or olympic competitions. Among priorities in

development of sports area in the USSR of intermilitary period was more important the social but not the bourgeois-selfish constituent.

In spite of such sporting autarchy itself, it was succeeded to lay the foundations of future sports schools, create a skilled base for swift flight of domestic sport in the second half of the XX-th century in Ukraine

Further researches should be directed to study the characteristics of non-Olympic sports in Ukraine during the second half of the 20th century.

LIST of abbreviations:

БГПО/БГТО / - be ready to labour and defensive

ВЦРПС is All-union central advice of trade unions

ГПО/ГТО / - ready to labour and defensive

ДІФКУ - the State institute of physical culture. Presently - **ХДАФК** (Kharkiv state academy of physical culture).

UKRAINE - the Ukrainian socialistic soviet republic (the name of Soviet Ukraine is from 1919 to 1937)

UKRAINE - the Ukrainian soviet socialistic republic (the name of Soviet Ukraine is from 1937 on 1991)

РСЧА - the Working-peasant red army (the name of soviet military powers from 1918 to 1946)

The USSR - Union of soviet socialistic republics.

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Functional state of the cardiorespiratory system of women with postmastectomy syndrome with different types of attitude to the disease

Abstract. Purpose: to determine the peculiarities of the functional state of cardiorespiratory system in women with postmastectomy syndrome with different types of attitude to the disease. **Material and methods:** analysis of the literature and empirical data; rheography, spirometry, the definition of the type of attitude to the disease of personality questionnaires of Institute of Behtereva; methods of mathematical statistics. 115 women with postmastectomy syndrome on clinical stage of rehabilitation were involved in this study. **Results:** in women with intra- and interpsychic types of attitude to the disease decreased reserve capacity of the cardiovascular and respiratory systems respectively. **Conclusions:** It was proved that women with a rational type of attitude to disease show significantly better results of the cardiovascular system compared to interpsychic and intrapsychic.

Keywords: type of attitude to the disease, cardiorespiratory system, women, postmastectomy syndrome.

Introduction. Leading literary sources [8, 9] indicate that breast cancer takes a leading place among the female population. The most common consequence of breast cancer is postmastectomy syndrome (PMES), which includes the manifestation of symptoms such as upper limb lymphostasis, limiting range of motion in the shoulder joint, sensory disturbances, cardiovascular and respiratory systems, quality of life, negative psycho-emotional effects, etc. [4, 5, 7, 9].

One of the features of cancer are psychiatric changes that occur in the most patients because and deeply affect not only mental but also on somatic components [1]. These changes influence on the healing process, further forecast of disease and quality of life of patients [3, 6].

Research the majority of scientists [3, 4, 6, 9] prove conclusively that all of the patients who had undergone radical treatment of breast cancer and having signs of postmastectomy syndrome, both in dire need of physical and psychological rehabilitation, conduct which would contribute to a marked improvement physical condition of the patient. Traumatic factors are the identification of malignancy, the presence of social representations about its lack of curability, a high percentage of deaths, future surgery, radiation and chemotherapy, which is closely linked with somatic discomfort [1, 3].

Given the wide polymorphism of PMES, individually-typological characteristics of a woman and relationship to disease, it is an urgent need to study the peculiarities of functional disorders on the part of the cardiorespiratory system in patients with postmastectomy syndrome with different types of attitude to the disease.

Relationship with the academic programs, plans, themes. The selected research direction corresponds to the research topic of Zaporizhzhya National University "The development, experimental testing and implementation in practice the measures of physical rehabilitation to improve the health status of different categories of people" (state registration 0114U002653).

Objective: to determine the peculiarities of the functional state of cardiorespiratory system in women with postmastectomy syndrome with different types of attitude to the disease.

Material and methods: analysis of the literature and empirical data; rheography, spirometry, the definition of the type of attitude to the disease of personality questionnaires of Institute of Behtereva; methods of mathematical statistics. The study was conducted at the Zaporozhye Regional Oncology Center and Sports Complex "Spartac" in Zaporizhzhya. The experiment involved 115 women with postmastectomy syndrome, the average age of the studied was 60,27±0,79 years. The functional state of the cardiovascular system was investigated using chest reography on software and hardware complex REOCOM (Scientific and technical center of electronic medical devices and technologies "XAI-MEDICA", Kharkiv).

The functional state of the respiratory system was assessed by computer spirometry on Spirographs SMF-21/01-"P-D" (Scientific Production Enterprise "Monitor").

Method of determining of the types of attitude to the disease of women based on information about its relation to a number of the most important life problems and situations directly or indirectly associated with the disease. To determine the types of attitude to the disease used a questionnaire developed in the Institute of Behtereva [2]. It allows to define 12 types of relationships to disease: harmonic, ergopathic, anozognozic, anxious, hypochondriac, neurotic, melancholic, apathetic, sensitive, egocentric, paranoidic, dysphoric.

In generalizing the results, all types of attitude to the disease have been combined into three blocks. The first block (rational attitude) included harmonic, ergopathic, anozognozic types of relationship, indicating the most favorable response of the patient to the disease; second block (intrapsychic relationship) – anxious, hypochondriac, neurotic, melancholic, apathetic, indicating intrapsychic orientation of the personal response to the disease in violation of social adaptation of patients; third block (interpsychic relationship) – sensitive, egocentric, paranoidic, dysphoric indicating interpsychic orientation of response.

Results of the research and their discussion. During studies of the functional condition of the cardiovascular system of women according chest rheography depending on the types of attitude to the disease (Table 1) it was found that in patients with rational type parameters of stroke volume, stroke index and left ventricular output was significantly higher compared with intrapsychic on 3,99 ml ($p<0,05$), 2,24 ml/m² ($p<0,05$) and 0,22 W ($p<0,05$) respectively, that indicating the best possible of cardiovascular system. Among other types of attitude to the disease were not observed any differences in the likely performance of the cardiovascular system.

Table 1

Comparison of the cardiovascular system ($\bar{X} \pm m$) in women with postmastectomy syndrome on clinical stage of rehabilitation with the different types of attitude to disease

Indicator		Rational	Intrapsychic	Interpsychic
stroke volume, ml	fact.	47,99±1,42	44,00±1,27*	46,61±1,60
	% of the fact.	73,98±1,80	71,26±2,08	73,05±2,81
stroke index, ml/m ²		27,10±0,80	24,86±0,71*	25,64±0,85
cardiac index, l/min·ml		1,96±0,04	1,87±0,05	1,89±0,06
left ventricular stroke work, kg·m	fact.	4,26±0,11	4,02±0,11	4,09±0,12
	% of the fact.	77,36±1,85	73,23±2,01	73,88±2,09
left ventricle power, W	fact.	2,22±0,07	2,00±0,07*	2,05±0,10
	% of the fact.	81,54±2,25	75,92±2,48	76,50±3,93

Notes: * – $p < 0,05$ comparing patients with rational and intrapsychological types of attitude to disease

Among the indicators of lung function (Table 2) significant differences are observed only expiratory reserve volume, which was higher by 0,19 l ($p < 0,05$) in women with the rational type of attitude to disease compared with interpsychic.

Table 2

Comparison of the respiratory system ($\bar{X} \pm m$) in women with postmastectomy syndrome on clinical stage of rehabilitation with the different types of attitude to disease

Indicator	Rational	Intrapsychic	Interpsychic
Vital capacity, l	2,47±0,03	2,45±0,04	2,38±0,05
Forced vital capacity, l	2,35±0,03	2,37±0,03	2,38±0,04
Forced expiratory volume 1 sec, l	1,99±0,04	2,09±0,04	2,05±0,06
Peak volume rate, l/s	3,16±0,14	3,35±0,14	3,01±0,14
Maximal expiratory flow 25 % FVC, l/s	2,77±0,12	3,03±0,12	2,76±0,14
Maximal expiratory flow 50 % FVC, l/s	2,79±0,12	2,94±0,11	2,66±0,12
Inspiratory reserve volume, l	1,06±0,05	1,15±0,05	1,22±0,07
Maximal voluntary ventilation, l/min	57,56±1,72	60,69±3,37	64,04±4,84
Expiratory reserve volume, l	0,75±0,05	0,71±0,05	0,56±0,07
Stange, s	45,05±0,75	46,40±0,85	47,38±1,05
Genchi, s	22,65±0,40	22,83±0,49	22,11±0,77

Notes: * – $p < 0,05$ comparing patients with rational and interpsychic types of attitude to disease

Thus, we can predict that those women who have intrapsychic and interpsychic types of attitude to the disease will be reduced accordingly spare capacity of the cardiovascular and respiratory systems without additional application reography and spirometry.

Conclusions. Results of the study indicate that women with the rational type of attitude to the disease show significantly better results compared to intrapsychic stroke volume of blood flow – 3,99 ml ($p < 0,05$), stroke index - on 2,24 ml/m² ($p < 0,05$), left ventricle power – 0,22 W ($p < 0,05$). In patients with the interpsychic type of attitude compared with the rational marked the worst performance in the expiratory reserve volume of 0,19 l ($p < 0,05$). According to other indicators of cardiorespiratory system significant differences could not fix.

Prospects for further research include determining the characteristics of quality of life of woman with postmastectomy syndrome with different types of treatment to disease.

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Socio-Educational Premises of Culture Building of Motor Activity in Students of Secondary Schools

Abstract. Purpose: the analysis of characteristics of the formation of a pupils conscious attitude of engaging in physical culture, preferences to the direction of physical education, to health and fitness activities, etc. **Materials and Methods:** the sociological research which was conducted among students of the fourth-eleventh grades of the secondary school № 67 of Kharkov. **Results:** the desire to attend lessons of physical culture reduces at pupils during the period of a study at the school. However, the use of sports games on lessons of physical culture gives them the greatest interest. Moreover, the analysis of the obtained materials showed that sports minutes are used from sports and health-improving actions the most regularly, which are must be carried out in the mode of a school day. It was revealed that the highest physical activity of pupils is on the lessons of physical culture during a day. **Conclusions:** the research confirms the role of social and pedagogical factors influencing the students' motivation to sports activities. Due to the results these factors determine the effectiveness of the system of physical education.

Keywords: physical culture, pupils, culture of motor activity, motivation, health.

Introduction. The children and adolescents formation of healthy, physically active lifestyle is relevant socio-pedagogical problem and its solution depends on not only the health and welfare of the individual, but also society as a whole. During creating of the conditions for the formation of children and adolescents healthy, physically active lifestyle should play the important role school system of physical education [12]. However, as the results of the research, only 20% of school age children can be considered healthy, 56% of students revealed the poor physical training [5; 7]. Most scientists think that this situation is stipulated for decreased levels of students physical activity [10; 11], during physiological school day inobservance normalized level of mental and physical activity, the students lack motivation to exercise [1; 6; 8; 9]. The studying of students' interests to extracurricular sports activity areas, the perception of physical education by students and their attitude to visiting physical culture lessons, that should precede the introduction of physical education in the process of modern means and forms of physical activity. Research findings indicate that the main direction of solving the problem of health for secondary schools students is increasing their motivation to exercise, that is, the formation of their personality on certain level of physical training. However, according to the analysis of some specialized literature, this problem is currently no complete solution [3]. It is in need the additional study conditions of the students conscious attitude to exercise, their motivation to attend the lessons of physical culture, the impact of exercise on their level of health.

Purpose: the analyze of features of formation conscious attitude by students in an educational institution to desire of students to attend physical education, preferences focus on the lessons of physical culture, holding fitness activities and more.

Material and methods of the research. The study was conducted on the basis of the secondary school № 67 in Kharkiv. 230 students from fourth to eleventh grades took a part in the research. During our study we used questionnaire closed. The respondents were questions about the content of physical activity, volume, and its implementation in the standby school day and at home. For each questions students chose one of the answers - "yes" or "no." During the processing of questionnaires was determined as percentage of the number of students choosing positive ("yes") and negative ("no") the answer to a question.

Methods of the research: theoretical analysis and compilation of scientific and methodical literature, sociological methods.

Results and discussion of the research. The study of students motivation to physical culture lessons were separated thematic blocks - especially the perception of students physical training, the attitude of children to attendance trends and extracurricular sporting activities of students. Results of the study show that the kind of rating factors that determine the motivation of students to attend lessons of physical culture, where the first place is the factor of "physical culture lessons visit reluctantly" (Table.).

On average across the sample it preferred to 40.4% of the surveyed students. The results also show that over the period of schooling decreased desire to attend lessons of physical culture. Thus, among fourth grade pupils factor "to attend lessons of physical culture reluctantly" preferred 32.4% of respondents; Five-ninth grades - 36.8%; tenth-eleventh - 52.0%. The second most important factor that determines the level of motivation of students to attend lessons of physical culture is "to attend lessons of physical culture eagerly." It preferred to 35.5% of students in the total number of students from fourth to eleventh grades who participated in the survey. It should be noted that the lessons of physical culture are more interesting for pupils of the fourth grade (42.6%) compared to the nine-fifths of students (33.9%) and tenth-eleventh grades (30.0%). The survey results also showed that the average for the entire sample, 15.8% of students attend school lessons on physical training that is necessary. The largest number of students in high school (28.5%) and the least in the primary school (6.5%).

Analysis of the survey results showed that the use of sport games at the lessons of physical training is most interest to students, noted that on average 53.0% of respondents. Pay attention to itself the fact that the lessons that use sport games, like most students of high school - 69.6%, compared to students basic (52.8%) and primary schools (36.6%). Results of the study showed that the lesson in which to increase physical activity of students used mobile games (relay races, funny and so starts. D.), took second place in original rating for use in class sports established by students. The most interesting it is for elementary students (65.2%) and primary (60.1%) of school.

Socio-educational premises of culture building of motor activity in students of secondary schools

№	Poll area	Students of the 4-th form n=66	Secondary-school students n=100	High-school students n=64	Mean value
		Results of the research (%)			
I. Factors that motivate students to attend lessons of physical culture					
1	I attend lessons of physical culture reluctantly	32,4	36,8	52,0	40,4
2	I attend lessons of physical culture with a great pleasure	42,6	33,9	30,0	35,5
3	I attend lessons of physical culture because it is necessary	6,5	12,6	28,5	15,8
II. The focus and content components of physical culture lesson that enjoy students the most of all					
1	Sports Games	36,6	52,8	69,6	53,0
2	Motor activity in the form of relays and fun starts etc.	65,2	60,1	30,9	52,1
3	Using of gymnastic exercises as a means of rehabilitation	44,0	46,9	60,6	50,5
4	Types of jumping	52,0	50,1	48,5	50,2
5	Rope jumping	45,5	34,4	30,0	36,6
6	Run and its variants	30,8	28,0	39,4	32,7
7	Climbing and preclimbing	36,4	21,9	16,0	24,8
8	Acrobatic exercises (crab position, "candlestick", tumbling, etc.)	24,0	21,9	21,2	22,4
9	Vaulting	15,3	18,8	18,1	17,3
10	Walking and its variations	15,1	16,3	18,4	16,6
III. Regular holding of sports and recreational activities in the school day mode					
1	P.T. break (physical training break)	75,8	40,6	34,0	50,1
2	Moving a break in the form of mobile games	48,5	30,0	25,0	34,5
3	Gymnastics before lessons	39,4	32,0	30,5	34,0
4	Moving breaks using gymnastic complexes	36,4	15,6	10,0	20,7
IV. Popularity forms of physical activity students					
1	During a lesson of physical training	27,2	34,4	62,0	41,2
2	During a break	51,5	21,9	18,0	30,5
3	At leisure	30,3	28,0	18,8	25,7

Among high school students only 30.9% prefer such form of the lesson organization. The analysis also showed that such factors as "using of physical exercises as a mean of recovery", occupies the third position in the ranking of content elements lesson of physical culture, which was determined by the average. The greatest preference. The high school students preferred to this factor most of all (60.6%), that is significantly higher compared to the survey average of students (46.9%) and primary (44.0%) school. The study found that on average 50.2% of students are interested in the lessons of physical culture to use varieties of hops as a special kind of physical activity.

It must be note that this means of basic gymnastics was preferred by about same number of students enrolled in fourth forms (52.0%), fifth-ninth (50.1%) and tenth-eleventh (48.5%). The next exercise - "rope jumping" is significantly lower in the ranking presented in Table. Students of fourth forms perform and enjoy the "jumping rope" at the lesson of physical culture (45.5%) most of all. It should be noted that the transition of students to secondary and high school traced tendency to reduce popularity of this kind of physical activity (from 34.4% in secondary school to 30.0% in the high). Priority kind of physical activity during a lesson according to only 32.7% of students are "running and its variants." In accordance with this result it occupies the sixth line of the rating. Pay attention that this is the least interesting exercise for students of secondary school age - 28.0%, and the most interesting for students of high school age - 39.4%. The seventh place ranking in the conventional focus on students' preferences and content elements lesson of physical culture (24.8%) is the factor "climbing and preclimbing". This type of physical activity is the most popular among elementary school students (36.4%). This exercise is less popular among secondary school pupils (21.9%) and much lower among seniors (16.0%). The results showed that the next step in this ranking is acrobatic exercises (22.4%). In all groups of students we observe about same level of interest in these exercises. According to the analysis of the study it was revealed that in its popular "vault" (17.3%) and "varieties of walk" (16.6%) are the ninth and tenth step of rating of more interesting for pupils types of physical

activity. The mentioned exercise are almost equal popularity in elementary schools (respectively 15.3%, 15.1%), secondary (respectively 18.8%, 16.3%) and high (respectively 18.1%, 18.4%).

According to the research of fitness activities which be conducted in the school day mode (P.T. breaks (physical training breaks), outdoor breaks, gymnastics before lessons, fitness pause), the most regularly used minute fitness (50.1%). Moreover, this form of physical activity is the most regularly used in elementary school, 75.8% of students of elementary school noted it, less regularly in the secondary (40.6%) and high (34.0%). Second place in the regularity event mode of a school day, according to students, is a break in the form of mobile outdoor games (34.5%). This type of physical activity most regularly in elementary school (48.5%) and the least attention to it is in high school (25%). As for the results of the research, "gymnastics before classes" as a whole reached 34% of students. Moreover, the highest rate of using of gymnastic exercises before lessons is in elementary school (39.4%) and the lowest - in high school (30.5%). Among the sports and recreational activities that are used in school, "mobile break using gymnastic complexes" are much less that 20.7% of respondents confirmed it. The most regularly this kind of physical activity used in elementary school (36.4%), much less in the secondary (15.6%) and high (10%).

The next area of sociological research was to identify the popularity of sports and recreational activities in the school day mode, and entertainment to ensure optimum motor activity of schoolchildren. Analysis of the research showed that during the day the highest physical activity of students in class is physical education, it was noted by 41.2% of students who participated in the research. The lesson of physical culture, as a period of maximum physical activity, 27.2% of students marked the fourth grade, 34.4% of students in secondary school and twice as many - 62.0% of students in high school. Another form in accordance with the importance of physical activity students are "mobile break between lessons" that was noted by on average 30.5% of students. 51.5% of elementary school students pay attention to active recreation during breaks and between lessons, another classes use this type of physical activity much less frequently (Table). The results showed that in general across the sample 25.7% of students in the period of greatest physical activity accounted for after lessons time. Leisure is an important part of children lifestyle that significantly affects their health. Physically active teenager will likely active adults. The ability to properly regulate free time for various kinds of activities during the day is an important parameter that influences on the health [2]. Results comparing of questioning of different classes students (from 4-th to 11-th classes) showed that 30.3% of primary school pupils, 28.0% of secondary and 18.8% of high school physical activity most accounted for leisure (tab.).

Conclusions:

1. The researches confirm the role of social and educational factors that influence on motivation of students to sports and sports activities and determine the effectiveness of the system of physical education. The need to take account of them due to the fact that during the period of schooling students decreases the motivation to exercise on physical training lessons. Thus, the results indicate that on average, 40.4% attend lessons of physical culture reluctantly.

2. The results of the research indicate that the main direction of solving the problem of raising the level of students physical activity is: 1) the formation of their personality and certain level of physical training by improving substantive components of physical culture lesson through greater using of sports games that marked 53.0% of pupils, relay, fun starts - 52.1% of students, various means of basic gymnastics - 50.5% of students; 2) by holding more regular fitness regime activities in the school day, especially mobile breaks using special gymnastics complexes (only 27.0% of students indicated that these activities are carried out) to gymnastics lessons (34, 0%).

3. Subjective assessment by the forth-eleventh grades of share various forms of physical activity in the total amount of daily activity showed that during the period of schooling increased role in this lesson of physical culture (from 27.2% in the fourth grade to 62, 0% in the tenth-eleventh grades), while decreasing importance of physical activity during breaks (from 51.5% in the fourth grade to 18.0% in the tenth-eleventh grades) and leisure (from 30.3% in the fourth grade to 18.8% in the tenth, eleventh grades).

Prospects for further research. In the further research is planned to develop pedagogical technology of culture means with the main motor of gymnastics for the fifth-sixth grades.

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Background development questionnaire quality of life for school age children with broncho-pulmonary disease

Abstract. Purpose: to prove feasibility of developing a questionnaire to assess quality of life for school-age children with acute broncho-pulmonary diseases. **Material and Methods:** analysis of scientific and methodological literature on the study of quality of life. **Results:** to assess quality of life using both general and specific questionnaires. The most of special are questionnaires designed for adults, and all pulmonary questionnaires designed for chronic diseases. There are of survey questionnaire for children with acute broncho-pulmonary diseases. **Conclusions:** the proposed of us a questionnaire for children with broncho-pulmonary diseases include questions to determine the effect impact of symptoms of diseases on motor activity and quality of life. In future we plans to cheak effectiveness of the application of this questionnaire for determine quality of life of children with acute broncho-pulmonary diseases with goal to determine the effectiveness of the rehabilitation process.

Keywords: quality of life, broncho-pulmonary diseases, children.

Introduction. Nowadays it is more often possible to meet qualities of life (QL) given relatively at treatment and rehabilitation of persons with different nosologies in scientific literature. According to V. I. Krivenko also co-authors. (2011), the term “quality of life is connected with health” (in English-speaking specialized literature - “health-related quality of life” is applied in medicine), under which a degree of wellbeing and satisfaction are understood those aspects of life which illness and its treatment influence [6].

In scientifically methodical literature over than 1000 general and special questionnaires are registered for the purpose of definition of QL [6].

Each of these questionnaires has criteria and scales of an assessment which differ among themselves by different signs (demographic, regional but other). Today many scientists of different branches are engaged in an assessment of QL of the population (economists, sociologists, physicians and others). The general questionnaire of Sf-36 which was developed in the Center of Studying of Medical Results (USA) in 1992 by Jonh E Ware and Cathy Donald Sherbourne is one of the most popular questionnaires which are used in Ukraine when carrying out researches for the purpose of an assessment of efficiency of the medical process [14; 17]. Its popularity is caused by that it is the most available in scientific literature, and it is considered as the most approved and validly [6]. By means of this questionnaire it is possible to estimate QL of respondents as different professions, and with different nosologies. And also to compare this indicator at persons who have certain diseases with almost healthy people from 14 years old [8;11]. The questionnaire of PEDSQL is widely used for the purpose of an assessment of QL of children in the countries of Europe, America and Asia [12] which includes a question as for children, and their parents / trustees.

Both general questionnaires on QL, and special questionnaires for patients with certain diseases are applied in medical practice. So, within ten special questionnaires, from which majority for bronchial asthma and their insignificant part, – for a chronic obstructive disease of lungs are used for persons with broncho-pulmonary pathologies [1; 2; 3; 6; 13].

As the concept QL is very wide and philosophical, there are also no only criteria of QL and consequently, and there are no standard norms of QL. However experts of WHO recommend applying the following main criteria of QL: physical, psychological, independence level, public life, and environment, spirituality which is differently packed and has components in different questionnaires.

Communication of the research with scientific programs, plans, subjects. The work is performed by a subject of the Built plan of the research work in the sphere of physical culture and sport for 2011-2015, a subject 4.2. “Physical rehabilitation of not full amendable with violation of activity of the musculoskeletal device” (number of state registration is 0111U006471).

The objective of the research: to prove expediency of the development of a questionnaire for the purpose of definition of QL for children of school age with sharp broncho-pulmonary diseases.

Material and methods of the research: the analysis of scientifically methodical literature concerning studying of quality of life is carried out.

Results of the research and their discussion. An indicator of QL is used actively when carrying out researches for the purpose of the development of aged-sexual standards, an assessment of efficiency of preventive actions, definition of complex influence of chronic diseases on children in the developed countries in pediatrics [4]. In general methods of an assessment of quality of life are rather well developed in practice for adult population, and some of them are applied to children (generally the adapted questionnaires).

The quality of life of a sick child is considered as the integrated characteristic of his state in modern health care [5].

For today studying of QL by means of special blanks (questionnaires) is all-accepted. Specifics of an assessment of QL at children are that modules of questionnaires differ on age; besides in the course of the research both a child and his parents take part [4]. However, as show results of the research of a number of authors, divergences often appear in an assessment of quality of life of a child and his parents [9; 15] and divergences between parents in an assessment of QL of their child [16].

Besides, the special questionnaires are calculated for persons with chronic pathologies. But any disease in this or that measure introduces amendments in human life of any age. Sharp broncho-pulmonary pathologies at children don't make exceptions. After all cough, get out of breath of different origin and degree, and decrease in physical activity demand

correction in everyday life of the child and her family. Therefore a renewal of function of external breath and prevention of emergence of complications or transition of a disease to a chronic form will be one of prime tasks at sharp broncho-pulmonary diseases. According to this purpose a complex treatment which includes at itself and physical rehabilitation is widely applied.

Interaction between rehabilitologist and a patient is one of factors of successful rehabilitation. Therefore by drawing up the program the expert has to consider not only data of objective inspection, but also value judgment of a condition of the patient (e.g. as a patient estimates influence of a disease on its everyday life which leads to the greatest discomfort which limits physical activity etc.). Therefore we developed the questionnaire of poll for children with sharp broncho-pulmonary diseases for the purpose of definition of influence of this disease on different components of its life and idea about individual reaction of a child to a disease (tab).

The questionnaire of poll of children with sharp broncho-pulmonary diseases

Questions	Answers					
	0-1	1-2	3-4	5-7	before 10	more than 10
How often (quantity of times) were you ill respiratory and viral infections during a year (RVI)?	0-1	1-2	3-4	5-7	before 10	more than 10
It is difficult for you to concentrate on classes at school	never	very seldom	sometimes	often	very often	almost constantly
Do you often should pass school because of broncho-pulmonary diseases?	never	very seldom	sometimes	often	very often	almost constantly
How many times are you ill to receipt to hospital?	1-2 days	3-6 days	7-10 days	10-14 days	about month	more than month
How often have you... for the last 3 days:						
Coughed	never	very seldom	sometimes	often	very often	almost constantly
Cough had exhausted you	never	very seldom	sometimes	often	very often	almost constantly
You have had an allocation of a phlegm	never	very seldom	sometimes	often	very often	almost constantly
You breathed a nose	never	very seldom	sometimes	often	very often	almost constantly
You have had allocations from a nose	never	very seldom	sometimes	often	very often	almost constantly
You have felt short wind at rest	never	very seldom	sometimes	often	very often	almost constantly
You have felt short wind at physical activity (e.g., raising on a ladder)	never	very seldom	sometimes	often	very often	almost constantly
You have had attacks of a whistling breath	never	very seldom	sometimes	often	very often	almost constantly
You have felt unpleasant pressure in a breast	never	very seldom	sometimes	often	very often	almost constantly
You have felt tension of a neck or shoulders	never	very seldom	sometimes	often	very often	almost constantly
How much time were you limited in the following kinds of activity through trouble breathing during the last 3 days:						
Sports or physical exercises	never	very seldom	sometimes	often	very often	almost constantly
It is difficult for you to walk upstairs	never	very seldom	sometimes	often	very often	almost constantly
You are compelled to pass school because of broncho-pulmonary disease	never	very seldom	sometimes	often	very often	almost constantly
It is difficult for you to put on, take a shower	never	very seldom	sometimes	often	very often	almost constantly
How often have you felt during the last 3 days:						
Anxiety, what can be worsen cough and breath?	never	very seldom	sometimes	often	very often	almost constantly
Anxiety, that you can lag from the school program because of a condition of health?	never	very seldom	sometimes	often	very often	almost constantly
Dejectedness because of problems with health	never	very seldom	sometimes	often	very often	almost constantly
That can't you do that children of your age do because of cough or short wind	never	very seldom	sometimes	often	very often	almost constantly
That because of your broncho-pulmonary disease, you sleep very bad	never	very seldom	sometimes	often	very often	almost constantly
How often do you feel:						
That it is difficult for you to be on friendly terms with your coevals	never	very seldom	sometimes	often	very often	almost constantly
That daily activity within the house is strongly limited	never	very seldom	sometimes	often	very often	almost constantly
That, despite of a disease, you feel sure when you leave the house	never	very seldom	sometimes	often	very often	almost constantly

This questionnaire contains questions which can conditionally be divided on: “general questions”, “symptoms”, “activity”, and “influence of a disease”. All questions which concern symptomatology and influence of a disease on the child’s life, concern the last three days of a disease which will help to understand better, how exactly the patient has a disease and what aspects of a disease cause most of all problems in the child. It in turn will allow approaching more carefully drawing up the rehabilitation program, considering influence of the given disease on health of the child. In this questionnaire the respondent has opportunity to choose the offered version of the answer (what questionnaire answers a certain point in the analysis), which, in his opinion, most precisely describes his state at the time of a poll.

In general, the smaller score will be gathered by the child, the higher will be estimated its quality of life.

Conclusions. QL are used both the general and the special questionnaires for the purpose of an assessment. The majority of special questionnaires are developed for adult persons, and all pulmonary questionnaires are developed for persons with chronic diseases. The offered by us questionnaire for children with broncho-pulmonary diseases includes a question for definition of influence of symptomatology of a disease on physical activity and quality of life of the child.

In subsequent it is planned to check the efficiency of application of this questionnaire for the definition of QL of children with sharp broncho-pulmonary diseases for the purpose of the determination of efficiency of the rehabilitation process.

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Evaluation of effectiveness of braking fragments passing performed by rally crews

Abstract. Purpose: to develop a methodology and criteria for evaluating the effectiveness of braking fragments performed by rally crews. **Material and Methods:** using the method of video shooting at 60 shot/sec, we recorded the kinematic characteristics of passing a braking fragment with length of 90 m performed by 38 rally crews of different skill level, all of them are participants of the 4th cycle of the Rally Cup of Ukraine 2014. **Results:** we have found defining, as for fragment passing time, characteristics for different groups of crews according to a position at the definite cycle, a position at the Cup testing, sporting improvement stages and vehicle classes. **Conclusions:** speed deviations at entering the braking fragment, maximum, and exit out of the braking fragment and their total deviations from benchmark indices shown by winners of the competition are realizable efficiency criteria of braking fragments performed by rally crews.

Keywords: rally, crews, fragments of braking, realizable efficiency, evaluation, criteria.

Introduction. The expert assessment of influence of factors of different nature on total results of crews in multi-stage competitions on motor rally which is carried out by authors [1], indicates the highest rating among other factors of influence on the progress of the competitive activity in the noted sport actually of preparedness of a crew (9,80 points by a ten-mark scale). The specifics of the competitive activity in motoring which are described in details in works [2; 3], demands from sportsmen especially high level of skill of driving in different conditions at the safest speed. Thus the leading role in the system "sportsman – car – road" plays actually a human factor.

Authors [2; 4] suggest comparing hour results of passing of special sites (SS) of different character by them by configuration, covering and width of a road, height differences, visibility and so forth for the objective estimation of sports-technical skill of rally crews. But, it is recommended to use batteries of special tests in works [5; 6] for estimation of sports-technical skill in motoring: on a motionless car (high-speed management and gear shifting), on exercise machines and on the ground. Relevant requirements are developed, possible mistakes, their reasons and ways of correction are noted for the estimation of quality of implementation of each test. A number of experts [7–9] consider a basis of technique of motoring skill of passing of turns. They give classification of turns by geometrical characteristics and difficulties of their passing, describe rational technique of overcoming of different turns on cars with forward, back and all driving wheels, analyze theoretical aspects of controllability of cars during the movement on curvilinear sites and so forth. The work is devoted to questions of the theory of movement of sports car by the route [10].

However the estimation of the realized efficiency of application by pilots of their skills during passing of separate fragments of the real route and the classification of its separate typical fragments developed insufficiently, as causes the relevance of the chosen direction of the research.

Communication of the research with scientific programs, plans, subjects. The work is performed according to a subject 2.17 "Modeling of biomechanical systems in difficult coordination sports" (the number of the state registration is 0111U006473) of the Built plan of the research work in the sphere of physical culture and sport for 2011-2015.

The objective of the research: to develop a technique and criteria of estimation of the realized efficiency of passing by rally crews of fragments of braking of high-speed routes. It is necessary to solve a number of tasks for the achievement of a goal, namely: to analyze the competitive activity of rally crews on special high-speed sites according to literature and pedagogical supervision, to learn passing kinematics crews of different qualification of a fragment of braking, and also to develop and to approve a technique and criteria of estimation of the realized efficiency of technique and tactics of passing of such fragments of the route.

Material and methods of the research. Before the stating pedagogical experiment it was attracted 38 rally crews – participants of the fourth stage of the national racing series "Cup of Estuaries 2014" (further – Cup) – rally "For the peace" (Nikolayev, 8-9 November in 2014) among which 13 crews at the stage of the maximum realization of individual opportunities (further – MRI), 14 – at the stage of preparation for the highest achievements (further – PHA) and 11 – at the stage of specialized basic preparation (further – SBP). The age of sportsmen – from 16 to 59 years old, among them 68 men and 8 women (one – is a pilot, seven – are navigators). The stage of the Cup of Estuaries was elected the ground of the research because it was the only full multi-stage cup of Ukraine from automobile rallies, and also the only multi-stage competition in 2014 in which at the same time crews take part at stages MRI, PHA and SBP that gave the chance objectively to compare results of their competitive activity was rather filled by participants. By means of video filming with a frequency of 60 shot/s from distance of 70 m it was registered kinematic characteristics of passing by noted crews of a certain fragment of the route of a special site (farther – SS) "Zaychevske – 2" with a total length of 90 m from a springboard after a 300-meter straight line to an entrance to a turn on 180°. The noted fragment of the route was marked by markers so that to register position of each car in every 10 m of the chosen fragment till 1/120 s (pic. 1). The application of video filming gave the chance to refuse less exact individual registrars of GPS-coordinates on each car – a peculiar revolting factor of the competitive activity. Further the average speed and average acceleration on each piece, a place of the maximum speed and the maximum acceleration, a way of braking and so forth paid off. Results of the pedagogical analysis of the competitive activity of rally crews undertook, hour sports results and the place in the rally "For the peace" is taken in attention by each crew and following the results of a four-landmark Cup, and also the stage of their long-term sports improvement during the analysis and interpretation of the received results. The mathematical processing of the received results provided

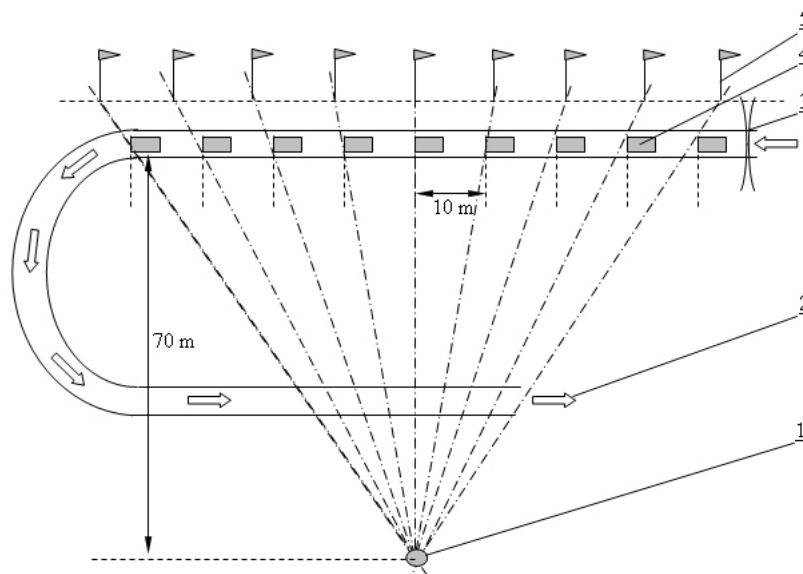
their check on distribution normality, calculation of the main statistical characteristics for the untied selections, and also correlation coefficients for Bravais-Pearson as all sizes that were compared, were parametrical.

Results of the research and their discussion. The pedagogical supervision of the competitive activity in motoring gives the chance to claim that the whole route can conditionally be distributed on standard fragments of three types: a) – dispersal, b) – braking, c) – turn passing. Any races begin with dispersal – a fragment of type a). After it braking comes surely – a type fragment b) before an entrance to a turn – a type fragment c).

Passing by a crew of each fragment is characterized by three main kinematic characteristics: speed of an entrance to a fragment, times passing of a fragment and exit speed from it which is the speed of an entrance to the following fragment of the route.

The simplest for estimation of the efficiency of its passing are fragments of type a). The difference of speeds on an entrance and at an exit from such fragment has to be the greatest, and criterion of the efficiency is absolute time of its passing.

It is much more difficult to estimate efficiency of passing of a fragment of type b) before a type fragment c). Thus any of the noted kinematic characteristics can't be applied as the only criterion of efficiency of passing of such fragment of the route. For the justification of the objective criterion we will consider a model of passing rally crew of a standard fragment of the route of SS of type b) after a fragment of type a) before a type fragment c) (pic. 1).



Pic. 1. Scheme of registration of kinematic parameters of passing by rally crews of a fragment of the route of a special site:

1 – video camera arrangement; 2 – direction of the movement of the car; 3 – “springboard”; 4 – car outlines; 5 – markers

For the detection of the most significant kinematic characteristics of passing of the chosen fragment of a distance we investigated correlation interrelation of fifteen different characteristics with total sports results of crews – the participants of competition expressed as average speed on all SS (in km/year.) without road and other penalties.

The main kinematic indicator of passing by crews of the chosen fragment – time of its passing – the most often correlates with the maximum speed registered on a fragment ($r = -0,93000$) with a speed of an entrance to the following fragment in) ($r = -0,85546$) but with a speed on a springboard which would be the speed of an entrance to a fragment) ($r = -0,83926$). The maximum speed closely correlates with a speed on a springboard ($r = 0,939066$) and with average narrowness – with a speed of an entrance to the following fragment of the route ($r = 0,694183$). Therefore it is expedient to consider the noted characteristics when developing the criterion of efficiency of passing by crew of a concrete fragment of the route of SS.

The average by narrowness correlation communication of time of passing of the chosen fragment is found out with an average speed of crew on all SS

($r = -0,695350$) that parametrically displays total sports result at the stage. The significant correlation communication is found between times of passing of a fragment and the maximum acceleration of braking ($r = -0,580382$), and also the average speed ($r = -0,51027$) specified to a car class.

Undoubtedly, the main indicator for the estimation of the realized efficiency of passing by crew of a certain fragment of a distance is time of its passing. Insufficient speed of an entrance to the following fragment worsens result of its passing therefore it is expediently obligatory to consider also this indicator. Speed theoretically has to be maximum on an entrance to a type fragment b). Its size will be defined by a length and a character of a covering of the previous fragment, technical characteristics of a car and technical skill of a pilot.

The safest speed of an exit from a type fragment b) will be defined by characteristics of the following curvilinear fragment of type c). Skill of crew is defined by ability most close to approach this speed as the insufficient speed of an exit will significantly worsen at once time of passing of a fragment c) because of need of additional dispersal of a car, and its

excess at best will force a pilot to choose less fast trajectory of passing of a curvilinear fragment (that will also increase the time of its passing) or will bring to an abandonment of the route and damage of a car (loss of tens of seconds or minutes or even an abandonment from a distance). Intensity of braking significantly changes a ratio of length of adjacent fragments of type a) and b) in interests of the first. The point of the top of extreme – the greatest speed – divides these fragments among themselves.

The quicker the crew is included into the shown fragment of the route in pic. 1, the better time of its passing to what testifies a close correlation connection between passing times crew of a fragment and its speed on a springboard which is the speed of an entrance to this fragment. As in rally result will be defined not in absolute values, and behind the taken place, as a standard of the maximum speed of an entrance to a fragment b) it is possible to accept the best indicator among all participating crews; this most concerns also the speed of an entrance to the following fragment c). For specific road conditions and character of a fragment of type b) there is some maximum safe speed for which it is conditionally possible to take average among three-four best results. At the determination of such speed it is also possible to consider a test group or a class of a car if there is statistically essential intergroup difference between such indicators.

However the analysis of results of participants of the stated pedagogical experiment (tab. 1) which is organized during the rally "For the peace" (Nikolayev, 08-09 November in 2014) shows that such approach to estimation of the efficiency of passing by crews of the chosen fragment of the route isn't objective up to the end, displays only statistically processed average values and doesn't consider a number of additional factors.

Table 1

Kinematic characteristics of passing of a fragment of SS "Zaychevske – 1" from a springboard to the left turn of twenty best participants of the rally "For the peace" (Nikolayev, 8-9 November in 2014)

№	Class a/m	V _{aver.} ³ km/year.	V _{spr.} ³ km/year	V _{max} km/year	a _{max} ² m·s ⁻²	Time, s	V _{ent.} ³ km/year	Place in abs.		Place in cl.	
								stage	Cup	stage	Cup
1	P8**	106,12	116,76	123,44	-8,78	2,85	74,48	1	1	1	1
4	P8**	105,47	116,76	119,99	-8,91	2,78	81,51	2	4	2	3
3	P8**	105,31	116,76	116,75	-8,36	2,86	77,14	3	2	3	2
2	P8**	104,03	113,68	119,99	-8,91	2,78	80,00	4	11	4	1
12	P8*	103,73	110,77	116,75	-9,02	2,95	71,48	5	12	5	11
5	P8	102,04	113,68	119,99	-10,53	2,81	77,14	6	3	6	4
8	P8**	104,41	116,76	123,44	-10,92	2,67	86,10	7	6	7	6
17	P8*	99,97	108,00	113,69	-12,37	2,95	72,00	8	17	8	16
9	P8*	99,40	127,06	127,04	-10,49	2,78	80,00	9	19	9	15
29	Ps6**	98,46	135,00	135,00	-12,38	2,67	83,08	11	13	1	1
67	P8**	96,91	116,76	119,99	-8,88	2,89	77,14	12	21	11	18
26	P6**	97,04	120,00	119,99	-13,22	2,80	83,08	13	22	1	1
11	P8*	96,23	98,18	116,75	-10,08	2,86	80,00	14	23	2	19
25	P7**	95,89	100,47	105,37	-7,26	3,15	73,22	15	15	1	2
34	P6	95,53	105,37	108,00	-7,67	3,09	67,50	16	24	2	2
20	P8*	95,15	110,77	113,69	-7,84	2,88	78,55	17	25	13	20
27	Ps6	94,99	108,00	108,00	-11,18	3,18	65,45	18	28	2	2
16	P8	93,87	110,77	110,77	-7,36	3,18	65,45	19	27	14	13
41	P6	92,01	110,77	113,69	-8,74	3,07	66,46	20	28	3	6
31	Ps6	91,85	116,76	116,75	-11,73	2,92	80,00	21	29	3	9

Note. ** – is the stage of the maximum realization of individual opportunities; * – is the stage of preparation for the highest achievements; without * – is the stage of specialized basic preparation. On three best indicators are highlighted in bold type.

Not all crews which quickly enter the route fragment elected by us, also quickly leave it: the correlation coefficient between speeds of an entrance and an exit makes only $r=0,605538$. The vast majority of crews (72%) after an entrance to the noted fragment continue dispersal, and exceptions are crews which entered a fragment with the maximum speed in comparison with their competitors. The correlation coefficient between times of passing of the fragment which was chosen for the research and the maximum speed appeared was the closest ($r=-0,93000$), that is it is expedient to continue dispersal after an entrance to this fragment. Considering the existence on an entrance of the chosen fragment of a springboard and risk to damage a car after a far jump, and also impossibility to disperse and direct a car in flight, eight crews which as a result were ahead of all others, chose tactics of a smaller speed of an entrance to a springboard and a shorter jump with further dispersal.

The crews of st. No. 9, 29 and 26 which are entered a springboard at the greatest speed (127,06, 135,00 and 120,00

km/year. respectively, in comparison with a similar indicator of prize-winners of the rally – 116,76 km/year.), as a result took the subsequent places (9, 10 and 12) that it is possible to explain by a superfluous riskiness, made mistakes and essential overloads of their cars. The indicative places are the taken by them places and following the results of the Cup – the thirteenth, nineteenth and twenty second.

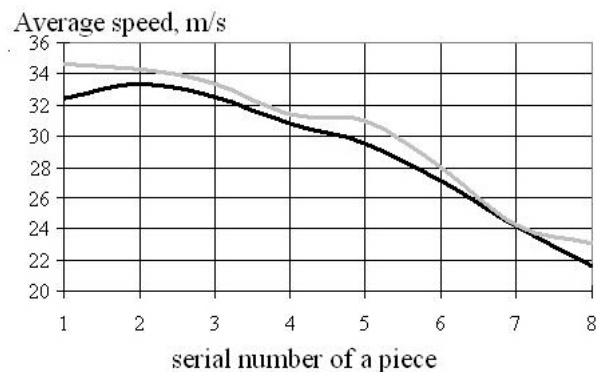
However the crews of No. 29 and 26 acted on weaker cars of the classes Ps6 and P6 with forward lead wheels, and such cars in comparison with four-wheel drive strong analogs of the class P8 don't give to pilots the tactical chance effectively to disperse after braking. The noted crews, despite of risk and overload on the cars, won first place both at the fourth stage in their classes, and following the results of the Cup which indicates certain differences of the creation of tactics of the competitive activity of rally crews which act on the most powerful four-wheel drive cars, and sportsmen who use less powerful mono-wheel drive technique.

The data provided in tab. 2 and in pic. 2 give the chance to compare nature of change of speed of the movement on the chosen fragment of the route of crews which showed its maximum sizes with similar indicators of leaders following the results of the rally.

Table 2

Average speed on separate pieces of a fragment of the route of SS of crews by which reference indicators were paid off

Number of pieces	1	2	3	4	5	6	7	8
Dist. from spr., m	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89
St. № crew	Average speed on a piece, m·s ⁻¹							
8	32,43	34,29	33,33	31,58	31,58	30,00	26,09	24,00
9	35,29	34,29	33,33	31,58	30,00	27,27	23,08	22,22
29	37,50	35,29	35,29	31,58	31,58	28,58	24,00	23,08
26	33,33	33,33	31,58	30,77	30,77	26,09	24,00	23,08
X ₁	34,64	34,30	33,38	31,38	30,98	27,99	24,29	23,10
1	32,43	34,29	33,33	30,77	29,27	26,09	24,00	20,69
4	32,43	33,33	33,33	31,58	29,27	27,91	24,49	22,64
3	32,43	32,43	30,77	30,00	30,00	27,27	24,00	21,43
X ₂	32,43	33,35	32,48	30,78	29,51	27,09	24,16	21,59



Pic. 2. Average speed on pieces of the chosen fragment of the route of SS of crews with the highest indicators (I) and leaders of the competition (II)

The crews of st. No. 8, 9, 29 and 26 which showed the highest indicators of speed, are included into a fragment at the maximum speed (34,64 m·s⁻¹) which after a springboard decreases gradually. On a site of 40-50 meters its stabilization is observed about 31,30 m·s⁻¹ at the level, then the intensive braking (to 24,29 m·s⁻¹) begins, and on the last ten meters its intensity sharply decreases, and at a speed of 23,10 km/year they enter turn – in the following fragment of the route c). Theoretically these crews could keep the speed shown on a springboard more long, however a “distant” jump throughout 20–25 meters, inevitable after the high speed of an entrance, doesn't give them the chance to disperse, causes a considerable destabilization of the car during its landing and demands additional actions for its course alignment (by the way, the part of crews which exceeded the safest for them speed on this springboard, for several years experience on this fragment respectable accidents and revolutions). Only upon the termination of the first emergency braking and alignment of the car, on the small piece about 10 m long noted above they manage to stabilize speed, and the following – also close to emergency – braking begins further. Precisely to calculate its efficiency is very difficult therefore on the last ten meters of a fragment noted crews cease to brake to enter turn at a speed which is calculated by them.

But the crews of the group of leaders of the rally (st. No. 1, 4 and 3) are included into a springboard on 0,90 m·s⁻¹ more slowly ($V_{spr.} = 32,43$ m·s⁻¹); further throughout 15–20 meters they continue to disperse to the maximum speed (to m $V_{max} = 33,35$ m·s⁻¹) then start braking with almost stable acceleration up to the entrance to turn – to $V_{ent.} = 21,59$ m·s⁻¹ (on 0,51 m·s⁻¹ more slowly, than the previously considered crews).

Such way of passing of the noted route fragment, despite of the slightly worst time (approximately on 0,10 s) gives the chance to avoid the destabilization of the car after a jump, controlling it throughout the whole fragment, on a certain piece to continue its dispersal, and also to lower an overload from landing and the emergency braking more precisely to calculate the safe speed of an entrance to the following fragment of the route on it. Total results of the rally completely would confirm advantages of such way of passing of similar fragments of the route of SS of type b).

The integrated criterion of the realizes efficiency of technique of passing by crews of a fragment of the route of SS of type b) has to consider all three kinematic characteristics which most closely correlate its passing over time, – V_{spr} are noted above., V_{tmax} and V_{ent} . It seems expedient as such criterion to calculate the sum of deviations of the noted speeds of a concrete crew from certain reference indicators which can be or the speed of crews which showed their highest sizes, or speeds of leaders of the competition. The comparison of speeds of V_{spr} is given in tab. 3-5., V_{tmax} and V_{ent} , and also their deviations from the reference sizes elected by us for different groups of crews. They are prize-winners, who finished on the subsequent places, and who ascended at the fourth stage of the Cup; prize-winners, crews who took places from the 4th till the 8th, and crews who took places below the eighth following the results of the four-staged Cup; crews at the stage of the maximum realization of individual opportunities (MRI), at the stage of preparation for the highest achievements (PHA) and at the stage of specialized basic preparation (SBP).

It was found out by us that in any ways of calculation of a total rejection of kinematic characteristics of passing by participants of the pedagogical experiment of the chosen fragment of the route of SS from reference, for leaders of the fourth stage of the Cup they are higher from similar indicators of crews which finished on the subsequent places, and their indicators, in turn, are higher than indicators of crews which didn't finish a distance. Such indicators of crews have also essential advantage at the stage of MRI over indicators of crews at the stage PHA, and indicators of the last – over indicators of crews at the stage SBP. The noted characteristics of leaders of the four-staged Cup are also higher from the same indicators of the crews which took the subsequent places, however the crews who took final places from the 4th till the 8-th have no advantage over the crews who took places below the eighth as highly skilled crews were among the last which, except the fourth stage of the Cup, at other its stages mainly didn't start that didn't give them the chance to gain the sum of points, big from their competitors, following the results of four stages, despite of rather high realized efficiency of passing of the chosen fragment of the route of SS by them. However the greatest and statistically reliable differences between speeds on a springboard, maximum and to an entrance to the following fragment of the route, and also between their deviations from reference and between total deviations Δ it is noticed rather reference characteristics of leaders of the stage taking into account a sign at their calculation.

The comparison of coefficients of correlation between passing times crews of the chosen fragment of the route and the most powerful kinematic characteristics of its passing (tab. 3) specifies that correlation coefficients between their deviations from reference, despite of their choice (the highest values or characteristics of leaders of competition), statistically don't differ (0,85033 and 0,85034 for ΔV_{spr} ; 0,93509 and 0,93517 for ΔV_{max} and 0,95191 and 0,94331 for an amount Δ), except a deviation from exit speed from a fragment (0,82488 and 0,77508). Considering the tactical advantage of a way of passing of a fragment by leaders, for estimation of the realized efficiency of passing by concrete crews of fragments of routes of SS of type b) as reference it is possible to recommend actually characteristics of leaders of the competition, but not their maximum values. Differences between reference and actual speeds, as well as a total deviation Δ it is better to count taking into account a sign as without its account the narrowness of interrelation between the calculated differences and times of passing of a fragment are significantly lower (0,75699, 0,64534, 0,84378 and 0,86190 respectively).

Table 3

Correlation interrelation between times of passing of the chosen fragment of the route of SS and the most influential kinematic characteristics of its passing for different ways of their calculation

Way of calculation	V_{spr} km/year	ΔV_{spr} km/year	V_{ent} km/year	ΔV_{ent} km/year	V_{max} km/year	ΔV_{max} km/year	Amount Δ km/year
For maximum	-0,85034	0,85033	-0,82505	0,82488	-0,93509	0,93510	0,95191
For maximum *	-0,83926	0,83915	-0,85555	0,85541	-0,93002	0,93002	0,95149
For leaders	-0,85034	0,85034	-0,82505	0,77508	-0,93509	0,93517	0,94331
For leaders *	-0,83926	0,83926	-0,85555	0,81696	-0,93002	0,92997	0,94393
For leaders abs. dev.	-0,85034	0,75699	-0,82505	0,64534	-0,93509	0,84378	0,86190
For leaders abs. dev.*	-0,83926	0,76669	-0,85555	0,73304	-0,93002	0,86048	0,88390

Note. * – taking into account crews which ascended at the stage.

Correlation coefficients between times and the offered criteria of the realized efficiency of passing of the chosen fragment of the route for crews which act on cars of different groups and classes are provided in tab. 4. It was appeared that for crews which act on the most powerful class P8 cars with a drive gear on all wheels, the vast majority of the noted correlation coefficients (and especially for a deviation from reference speed on a springboard – 0,44464) is statistically reliable below similar indicators of crews which act on cars with a drive gear on one axis, and from average values. The exception makes only a deviation from the speed of an entrance to the following fragment of the route. The found differences should be considered during estimation of the realized efficiency of technique of passing of such fragments of routes of SS and an individualization of preparation of separate crews.

Considering a rather small number of crews in classes (5 in the class Ps6, 5 in the class P7, 9 in the class P6 and seven in the class P5 in comparison with 14 crews in the class P8), the received results can be applied only to these concrete selections.

Table 4

Correlation interrelation between times of passing of the chosen fragment of the route of SS and the most influential kinematic characteristics of its passing for different classes of cars

Class of cars	$V_{spr.}^?$ km/year	$\Delta V_{spr.}^?$ km/year	$V_{ent.}^?$ km/year	$\Delta V_{ent.}^?$ km/year	$V_{max}^?$ km/year	$\Delta V_{max}^?$ km/year	Amount Δ km/year
P8 (four-wheel drive)	-0,44464	0,44464	-0,93606	0,85682	-0,82369	0,82369	0,82892
Mono-wheel drive	-0,88079	0,88079	-0,80373	0,75724	-0,92287	0,92280	0,94485
Class PS6	-0,96009	0,96009	-0,96055	0,96055	-0,96358	0,96327	0,97256
Class P7	-0,98609	0,98609	-0,64272	0,64272	-0,95594	0,95594	0,98069
Class P6	-0,77750	0,77750	-0,91526	0,75786	-0,89587	0,89587	0,90027
Class P5	-0,87513	0,87513	-0,62997	0,62997	-0,94779	0,94826	0,96281
All cars	-0,85034	0,85034	-0,82505	0,77508	-0,93509	0,93517	0,94331

Conclusions:

1. They can conditionally be divided into three groups of fragments for estimation of the realized efficiency of technique of passing by rally crews of routes of SS: dispersal (type a), braking (type b) and passing of turns (type c). Tactics of passing of fragments of braking of type b) with a springboard on an entrance is the least studied.

2. Tactics of passing of such fragments of braking by their leaders (moderate speed on a springboard, continuation of dispersal after a phase of flight and a stable braking up to an entrance to turn) is recommended from positions of high total sports result of multi-stage competitions from motor rally but not tactics of crews which showed the minimum time of passing of such fragment with the maximum speed on a springboard, the first emergency braking with additional stabilization of the car after a jump and the second early emergency braking before an entrance to turn.

3. The objective criteria of estimation of the realized efficiency of passing of fragments of braking the rally of SS with a springboard on an entrance is a deviation of speeds of an exit from a springboard maximum on a fragment and to an entrance to the following fragment of the route of a concrete crew from reference average values of leaders of multi-stage competition, and also a total deviation of the noted speeds. Values of these criteria are statistically authentically lower for crews – prize-winners in their classes following the results of the stage and multi-stage competition, than for the crews which took the subsequent places or ascended, and also for the crews at the stage of MRI in comparison with their competitors at the stages of PHA and SBP.

Prospects of the subsequent researches. The development of a technique of individual sports-technical training of rally crews on the basis of an objective estimation of the realized efficiency of passing by them typical fragments of routes of SS with an application of modern GPS-technologies of an express measurement of kinematic parameters of a movement.

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The system of training of future teachers of physical culture for use of means of art pedagogics in the professional activity

Abstract. Our research is devoted to a search of innovative approaches to vocational training of future teachers of physical culture.

Purpose: to prove and to develop theoretically the system of training of future teachers of physical culture for use of means of art means in the professional activity. **Material and Methods:** theoretical analysis, synthesis and synthesis of references, pedagogical supervision, questioning, testing, interviewing, pedagogical experiment, methods of mathematical statistics. **Results:** the system of training of future teachers of physical culture is developed and approved for use of means of art pedagogics in the professional activity. **Conclusions:** the developed block system in a complex provides an assimilation of theoretical and practical fundamentals of art pedagogics by students, and also an acquisition of practical experience of application of art means during passing the pedagogical probation at schools.

Keywords: future teachers of physical culture, art pedagogics, vocational training, structure of preparation, system of training.

Introduction. The new concept of the development of physical culture in Ukraine predetermines the need of corresponding changes for training of future teachers of physical culture for the system of higher pedagogical education. In the line of an active search of new educational models, methods and forms of the organization of pedagogical work, ensuring connection of pupils of means, traditional for the formation of physical culture with means of different types of art has considerable reserves that in total received the name of art pedagogics in the modern scientific literature.

In the course of study of scientific literature it is found out that such aspects of the broken problem are investigated by scientists: the content of the modern concept of training of future experts of physical culture and sport at the higher school are opened (G. Olefir, V. Platonov, L. Sushchenko, I. Shaposhnikova and others), the essence of art pedagogics and its role in the development of the personality is defined (T. Dobrovol'ska, Y. Taranova, I. Shevchenkota, others), certain questions of application of means of art pedagogics in the vocational training of future teachers of physical culture and ensuring preparedness of experts for application of these means in the subsequent are reflected in the practical pedagogical work (T. Roters, Y. Taranova, N. Shumakova and others). Highly appreciating the scientific importance of the conducted researches, it should be noted nevertheless that training of future teachers of physical culture for use of means of art in the pedagogical activity wasn't a subject of a separate pedagogical research.

Results of the analysis of a theoretical and practical condition of the vocational training of future teachers of physical culture certify that it answers with an incomplete measure to expectations from the society and to state standards of higher education. In particular, students of sports specialties are poorly prepared for use of art pedagogics in the educational process of a school. On the basis of the above the conclusion is drawn on need of the development and the theoretical justification of the system of training of future teachers of physical culture for use of art pedagogics for the professional activity.

Communication of the research with scientific programs, plans, subjects. The research is executed according to a subject of the research work of the chair of the theory and technique of professional education of G. S. Skovoroda Kharkov national pedagogical university "The increase of efficiency of the teaching-educational process in secondary general education and highest institutions" (PK No. 1-20019U004104).

Results of the research and their discussion. As it was found out during the research, preparedness of future teachers of physical culture for use of means of art pedagogics in the professional activity is not a separate component of their all-professional preparedness, and penetrates all its components. Therefore on the basis of comparison of different views of experts (O. Azhippo, Y. Vaskov, L. Deminska, Y. Dagnev, P. Yefimenko, Y. Zheleznyak, L. Zubchenko [1; 3-8] but other) it is defined that the structure of preparedness of teachers of physical culture for use of art pedagogics in the professional activity includes such elements: motivate-valuable, cognitive-functional and personal.

In turn, on the basis of the accounting of conclusions of scientists (Y. Babansky, Y. Bondarev'ska, T. Davidenko, I. Shamova [9; 2; 10] but other) the conclusion is drawn that the system of training of future teachers of physical culture for use of art pedagogics in the professional activity as a kind of the pedagogical system includes such three blocks: conceptually-purposeful (theoretic-methodological principles of the research, the purpose and tasks of the above-mentioned preparation, principles of its implementation), learning-procedural (the content of preparation at strategic, complex and local levels, methods and forms of its realization) and control-correcting (the control of a state and the current results of this process, and also carrying out of need of the correcting procedures). In the course of the subsequent research the reasonable structure of the above-noted system got a concrete filling.

So, during the development of *the conceptually-purposeful block* of the system it was defined that the basic theoretic-methodological principles of the research are such approaches: 1) *system* from which position a training of future teachers of physical culture for use of art pedagogics in the professional activity is perceived as a complete system which all components are closely connected and interact among themselves, and each of them is also the system education; 2) *personally-active* that provides a transformation of students at active subjects of the vocational training who not only act as co-organizers of this process, but also take the responsibility for its results; 3) *culturological* that provides the direction of future teachers of physical culture in the course of preparation for use of art pedagogics in the professional activity to seize the best achievements of universal and national culture.

The purpose of training of future teachers of physical culture for use of means of art pedagogics in the professional activity is the formation of preparedness for this work. This purpose is concretized through such *tasks*: 1) the ensuring of

understanding by students of pedagogical potential of art pedagogics, the development in future experts of motivation, concerning mastering skills of use of these means in the professional activity; 2) the mastering knowledge by students which is necessary for implementation of the professional activity with application of art pedagogics; 3) the formation of professionally necessary abilities at future teachers of physical culture; 4) the control of a condition of training of future teachers of physical culture for use of art pedagogics in the professional activity and to its results, in need of entering into this process of corresponding changes.

On the basis of studying of scientific literature (V. Naumchik, T. Odnolitok, O. Tymoshenko but other) the conclusion is drawn that during the implementation of training of future teachers of physical culture for use of art pedagogics in the professional activity which is a subsystem of their all-vocational training, it is necessary to be guided by such pedagogical principles: *organizational* (principles of a humanistic orientation, following, continuity, integration and so forth); *generally didactic* (scientific character, presentation, availability, and so forth); *principles of the educational activity of students* (sensibleness and activity, independence, responsibility, and so forth).

The learning-procedural block of the system of training of future teachers of physical culture for use of art pedagogics in the professional activity defines the maintenance of the corresponding preparedness and methods and forms of its providing. It is defined that the maintenance of this preparedness includes at itself motivation to mastering of art-pedagogics, manifestation of the valuable relation to the development of physical culture of pupils on the basis of use corresponding of art pedagogics, set of knowledge, abilities, and professionally personal qualities which are necessary to future teachers for application of art pedagogics in the pedagogical work, and also an adequate self-assessment of the formation of these qualities.

The content of training of future teachers of physical culture for use of art pedagogics in the professional activity is developed at the interconnected levels: strategic, complex and local. At *the strategic* level the content of this preparation includes knowledge about: essence, main regularities and provisions of art pedagogics; the leading tasks of use of art pedagogics in the educational process of a school; methods and forms of the organization of the pedagogical process on the basis of use of various art forms and so forth. At *the complex* level the content of the noted preparation includes knowledge about: pedagogical opportunities of use of separate art pedagogics on classes in physical culture; pedagogical effect of different options of a complex combination of several art pedagogics in the professional activity of a teacher of physical culture; didactic materials on the outlined problem (collecting of pieces of music, collection of reproductions, records of works of art of a different look are didactic multimedia materials for a school) that can become in an adventure in the context of the solution of the put tasks. At *the local* level the content of the noted preparation includes knowledge of possibility of application in the professional activity of different complexes of art pedagogics during teaching at a school of concrete subjects on classes on physical culture, and also in after-hour work with pupils.

Training of future teachers of physical culture for use of art pedagogics in the professional work includes also the formation at students of necessary groups of abilities. So, at *the strategic* level the content of this preparation includes *analytical* abilities which provide an ability of students to define and analyze the main regularities and provisions of art pedagogics, to formulate tasks of use of art pedagogics in the educational process of a school and so forth. At *the complex* level the content of the noted preparation includes *analytical* abilities which allow future experts to estimate competently possibilities of use of separate art pedagogics and their complex connections on classes on physical culture and so forth.

At *the local* level the content of the noted training of future teachers of physical culture includes such groups of abilities: analytical, constructive, organizational, communicative, and art-applied. The group of *analytical* abilities includes such: to analyze information on the course and results of lessons of physical culture with application of art-pedagogics, to formulate competently the current tasks in the professional activity and to find an optimum version of their decision, to define connections between the different pedagogical phenomena and so forth. The group of *constructive* abilities includes such: to select, analyze, synthesize a training material with an inclusion to it certain works of art, to plan the structure of actions of a pupil and the pedagogical management of the educational process on the basis of application of art pedagogics; to project competently material resources for application of art pedagogics and so forth. Such belong to the group of *organizational* abilities: to realize pedagogical requirements according to concrete circumstances of communication, to interest pupils in new prospects on the basis of use of art pedagogics, to distribute an assignment taking into account specific features of pupils, their abilities in the field of different types of art and so forth. The group of *communicative* abilities contains such: to come into emotionally-communicative contact with other people, to find the correct tone in different situations of pedagogical communication, etc. *The art-applied* ability is united by abilities which are directly connected with introduction of art pedagogics in the professional activity. These are such abilities: to sing, to dance, to draw, to play musical instruments, expressively to tell, to read poems, to show theatrical action and so forth.

Training of future teachers of physical culture for use of art pedagogics in the professional activity provides also the formation in them the corresponding professionally-personal qualities: *physical fitness* (the result of physical preparation which is reached when performing the physical actions necessary for the assimilation or using by a person of the professional activity is characterized by the level of functionality of different systems of an organism and to the development of the main physical qualities); *creativity* (ability of a person to generate original ideas, decisions which differ from traditional); *virtuosity* (art endowments, refinement of manners, creative skill); *empathy* (ability to understanding of other person and empathy); *reflectivity* (property of a person who is shown in its ability to analyze actions and acts, to realize critically own features and opportunities in self-control of activity and behavior).

The noted block includes methods and forms of providing the specified maintenance of preparedness of future teachers of physical culture in use of art pedagogics in the professional activity. During the research the conclusion was drawn that the successful achievement of the aim provides pedagogically expedient combination as traditional methods and forms of the organization of a study (lecture, seminars, practical training, conversations, and so forth), and active and interactive methods and forms of a study (binary lectures, trainings, business and role games, performance, sets of

exercises on aerobics, shaping and so forth). The student teaching is taken the central place among these forms of a study that allows students to gain an experience of application of art-pedagogics of practical pedagogical activities.

The control-correcting block of the system of training of future teachers of physical culture for use of means of art pedagogics in the professional activity includes such methods of diagnostics as testing, questioning, supervision, conversations, expert estimation, analysis, generalization, and so forth.

Conclusions. The developed block system of training of future teachers of physical culture for use of means of art pedagogics in the professional activity in a complex provides the assimilation by students of theoretical fundamentals of art pedagogics, mastering them with art-pedagogics abilities in the educational and quasi-professional activity, and also the acquisition of practical experience of application of art-pedagogics during passing of the student teaching at schools.

Prospect of the subsequent researches. Questions of training of teachers for the realization of art pedagogic maintenance in the professional formation of future teachers of physical culture, and also the organization of self-educated activity of future teachers of physical culture, concerning the increase of level of art pedagogic competence are perspective for the subsequent scientific search.

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Influence of information communicative technologies on students' sport-oriented physical education interest

Abstract. Purpose: determination the influence of information communicative technologies on students' interest in regular exercise of sport-oriented physical education. **Material and Methods:** in the researches were involved 1–5 year basic department students of V. N. Karazin Kharkov National University (n=36402). **Methods:** analysis of literature sources, formatted pedagogical experiment, sociological research, maths statistics. **Results:** through experimental research we found out that usage of information communicative technologies in authors' model of sport-oriented physical education in high schools had provided increase in amount of students, who engaged in chosen sports (moving activity), by 14,4% (1463 persons). **Conclusion:** the usage of information communicative technologies in educational process promoted increasing of student quantity in the sport-oriented groups.

Keywords: student, sport-oriented physical education, information communicative technologies.

Introduction. Now the degree of an involvement of students into regular trainings of physical culture and sport becomes the main criterion of preservation of a subject matter “Physical education” and one of the self-determinative factors of functioning of the system of physical education of higher education institutions in connection with the reorganization of the educational process in higher educational institutions (HEI) of Ukraine [5].

The orientation of physical education to the digestion of rigidly regulated material does impossible the perception of a student as a person and doesn't promote the development of his identity. At the present stage the substantial part of the traditional system of physical education of higher education institutions which is constructed on a strict regulation and authoritativeness of the educational process, needs introduction of new directions of the organization of classes in physical culture. The use of traditional approaches to the organization of classes in physical education has no due influence on the aspiration of students to physical activity, sports activities and continuous self-improvement now [4; 5].

In today's conditions tendencies of the development of education assume a transfer of management of the process of training on the new technological level providing the use of information technologies that is an indispensable condition of the improvement of quality of education [2; 3; 9]. However at the present stage there is no uniform approach to the organization in higher education institutions of the sports-oriented physical education (SOPE) with the use of information technologies. The influence of an application of information technologies as on the formation of the sports-oriented educational groups, and on the efficiency of SOPE is investigated insufficiently. In connection with it the research of theoretical and practical components of this aspect is actual and has an essential value for preservation and improvement of the system of physical education in higher education institutions.

The analysis of the last researches and publications showed that now everything is more widely used by SOPE of students in higher education institutions which is based on the principles of a conversion of sports training, a free choice of a kind of sport and promotes the formation of personal physical culture of trainings [4; 8]. Sports activities or different types of physical (motive) activity are an irreplaceable way of the organization of the natural process of maintenance of a homeostasis – a vital condition of formation, strengthening and preservation of physical, spiritual and moral health of a person. The science-based need of integration of systems of physical education served as the reason of creation of the concept of SOPE [1].

The use in physical education of student's youth of the sports-oriented technologies promotes the increase of interest of students in physical culture in the educational space of higher education institutions therefore there is a stage-by-stage increase of the level of their knowledge of physical education and a certain sport, an increase of volume of physical activity in study hours and after hours [4;7].

Most of researchers are convinced that the mass computerization of higher education institutions forms the expediency of work in this direction for what are necessary: in-depth and versatile studies of the educational process on discipline “Physical education” taking into account the purposefulness and the efficiency of introduction of information technologies; the detailed development of concrete techniques and the creation of an essentially new model of the whole process of training in physical education [3; 6; 9].

Communication of the research with scientific programs, plans, subjects. The research is conducted according to the Consolidating plan of the research works in the sphere of physical culture and sport for 2013-2014 on the subject “Theoretic-methodical bases of application of information, pedagogical and medico-biological technologies for the formation of a healthy lifestyle” (No. of the state registration is 0113U002003).

The objective of the research: to determine the influence of application of information and communication technologies on the level of an involvement of students into regular trainings by physical culture and sport at the sports-oriented physical education.

Material and methods of the research. We made the sociological experiment in which interest of students was defined by questioning concerning classes by the chosen sports (physical activity) for the definition of the influence of information and communication technologies on dynamics of the involvement of students of V. N. Karazin Kharkov National University (KNU) in the sports-oriented groups during the period from September, 2005 to May, 2014. Students (n=36402) of 1-5 courses of the main department took part in the questioning.

Results of the research and their discussion. According to most of scientists, today an important problem is the

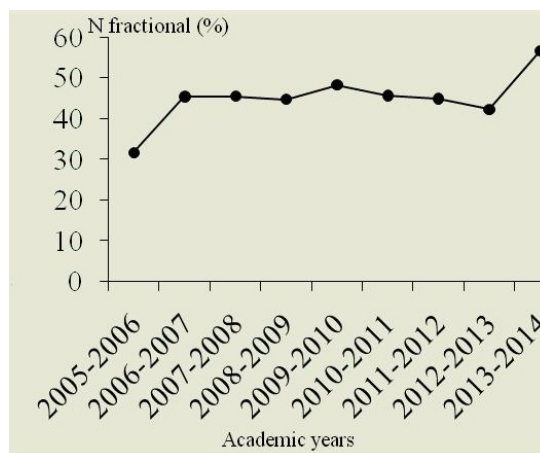
optimization of volume of physical activity of students with the use of various forms of the organization of the educational process for physical education [4; 5; 8].

In nine academic years after the introduction of the author's model of SOPE SOFV in the 2005/2006 academic year there were essential changes of an indicator of an involvement and interest of students of KNU by the SOPE directions on 17 sports (physical activity) which were united in three directions: fitness, game sports, single combats (tab. 1).

Table 1
Distribution of students of the main department in the SOPE directions

SOPE directions	Academic year								
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Game sports, quantity	1194	1666	1565	1767	2012	1861	1709	1468	1951
Single combats, quantity	403	616	577	455	491	427	365	423	614
Fitness, quantity	1074	1741	2019	2070	2044	1936	1697	1734	2523
Total, quantity	2671	4023	4161	4292	4547	4224	3771	3625	5088
Total number of students of a day form of education	8424	8843	9117	9585	9390	9239	8385	8569	8978

After the transmission of the educational process on physical education on the sports-oriented form of the organization increase of an absolute number of students of a day form of education (tab. 1) and a percentage indicator (pic. 1) of their involvement into regular trainings was recorded by the preferred sports (physical activity). So, the number of students who were engaged in SOPE, increased from 2671 to 4023 people (from 31,7% to 45,5%) in the 2006/2007 academic year in comparison with the previous academic year. For the next three years the increase in number of students from 4161 persons (45,6%) to 4547 people (48,4%) is noted that testifies to the increase of their interest concerning classes in the system of SOPE.



Pic. 1. Dynamics of a percentage indicator of the involvement of students in the educational groups of SOPE

For the next 2010/2011, 2011/2012, 2012/2013 academic years we recorded the decrease in interest of students concerning classes of SOPE for 3,4% – from 4224 people (45,7%) to 3625 people (42,3%) that served as the reason of introduction and the use in the author's model of SOPE of information and communication technologies.

In our opinion, just the use of the informational component acts as the integral and leading component of the model of SOPE of higher education institution adapted for present realities at the present stage of reorganization of the system of the higher education of Ukraine which has to give necessary knowledge of the new information environment of the society and form new outlook at trainings. In this regard the need of active development and introduction of information and communication technologies in the process of physical education ripened as the computerization of the educational activity is the objective requirement demanding the manifestation of mobility, initiative and creativity [6]. Therefore the creation of Internet site of the chair of physical education and sport (<http://sport.univer.kharkov.ua>), connected with the page of the chair on the site of KNU (http://www.univer.kharkov.ua/ua/structure/leisure/sport_department), for the purpose of the increase of efficiency of functioning of SOPE at university, became one of the fundamental directions of the use of the information technologies applied in our research.

During the development and the creation of the site we considered the pedagogical expediency of application in the subject environment of physical education of information and communication technologies which in our case are personally oriented and directed on the educational activity of a student.

By means of the site the work on SOPE in higher education institution is systematized, providing both to students, and entrants opportunity even before entering the university to receive information on an order of the organization of the

educational process, sports constructions on which studies pass. The publicity which distinguishes the cathedral site, makes materials available for perception by students and teachers, gives opportunity to leave comments and to receive feedback from participants of the educational process.

By results of the carried-out analysis of literary and documentary sources, considering basic provisions of the theory of physical education and sport (L. P. Matveyev, 1991; V. M. Platonov, 2004–2013; T. Yu. Krutsevich, 2003–2013) and results of the researches of the practical work of the chairs of physical education of various higher education institutions, we optimized and introduced the author's model of SOPE in the educational process of KNU in the 2013/2014 academic year [7] which contains such key components:

–conceptual – it defines the purpose, tasks, principles of target orientations, pedagogical conditions of management of the educational process at SOPE which are realized by means of forms of the organization and methods of application of IT;

–motivational and activity – it determines a target orientation and educational interaction of information and communication technologies by the directions of SOPE for assimilation by students of the contents of the training program, realization of the purpose and tasks;

–productive – it determines efficiency of the educational process by PE in higher education institutions by the determination of level of an involvement and interest of trainees by regular trainings of physical culture and sport, formations of a healthy lifestyle in the student's environment.

The obtained data testify that, the increase of level of an involvement of trainees into the sports-oriented groups of physical education from total of students of day form of education made 14,4% after the introduction in the 2013/2014 academic year in the educational process of SOPE of information and communication technologies. It was recorded positive dynamics of the general and relative indicators (see tab. 1, pic. 1) of number of the students involved in regular trainings by physical culture and sport at SOPE from 3625 people (42,3%) to 5088 people (56,7%).

Conclusions. By results of the conducted researches we recorded that during the period from 2005/2006 till 2013/2014 academic years the number of the students who are engaged in the preferred sports and physical activity at SOPE in V. N. Karazin KNU increased from 2671 till 5088 people. It is noted the increase also not only total of the students who are engaged in SOPE at the university, but also 25% increase concerning an indicator of an involvement of students of a day form of education in SOPE: – from 31,7% in the 2005/2006 academic year till 56,7% in the 2013/2014 academic year.

The ascertaining of increase of the level of an involvement of trainees into regular trainings of the chosen sports and physical activity for 14,4% (1463 persons) became the result of the use of the author's model of SOPE with an application of information and communication technologies, according to sociological researches within one academic year in the educational process of the university.

Prospects of further researches. Carrying out researches on scientific justification of an application of information technologies in the sports-oriented physical education of students of higher education institutions is supposed.

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Screening-questionnaire subjective evaluation of lifestyle for women in reproductive age

Abstract. Purpose: To detect the concern about lifestyle among women in reproductive age. **Material and methods:** analysis of scientific and methodical literature, screening questionnaire. **Results:** Screening results based on the questionnaire of prof. G. S. Nikiforova "Subjective evaluation of lifestyle and physical health" among the women in reproductive age were reviewed. **Conclusion:** It has been found out that high percentage of women 18-25 years old and low percentage of women 26-35 years old lead healthy life style.

Keywords: reproductive age, screening research, questionnaire "Subjective evaluation of life style and physical health".

Problem formulation. The analysis of statistical materials of Ministry of Health of Ukraine shows that during the last 10-15 years a very alarming situation, connected with the reduction of physical health indexes, has developed in Ukraine, diseases and death indexes have increased among the working-age population.

Lately the question about healthy life style has become people's prior value of life. Nomination of health problem among the priorities of the social development of the country determines the urgency, the need of research and the production of manuals and organizational approach to preservation and strengthening health of the population, especially for women of reproductive age, forming a healthy lifestyle. According to the results of many studies, the increase of life expectancy should not be connected with the successes of medicine, but with the involving the population to a healthy lifestyle, increasing in the volume of motor activity, food quality control supply, improvement of living and working conditions, the prevention of the effects of emotional stress [1,2].

In modern conditions of life the environmental pollutants, the intensification of the standard of living, bad habits, lack of exercise contribute increasing morbidity and functional disorders of organs and systems of reproductive age women. According to the World Health Organization (WHO) "reproductive health is a state of complete physical, mental and social well being, and not just the absence of disease or complaints in all matters relating to the reproductive system and to its functions and processes [3,5].

Reproductive health is an important part of general health, and takes the central place in human development. It is related to personal and highly valuable aspects of life. Being not only a reflection of health in childhood and adolescence, it also provides the basis for health after reproductive years of life for both women and men, and determines the effects transmitted from generation to generation [4,6].

Early diagnosis and health evaluation allows you:

- to identify weak elements in the body for ideliberate action;
- to make up an individual program of wellness exercises and to evaluate the effectiveness;
- to predict the risk of life-threatening diseases.

In health diagnosis screening is defined as the estimated identification of the specific or unrecognized disease or condition with the help of tests, researches of various types and is carried out without time-consuming (Kundiev Y. I., Nagornaya A. M., 2006). Special techniques, questionnaires or tests are used for screening, which must meet the following requirements:

- simplicity, practicality, comfort, economic viability;
- no injury;
- peculiarity.

The connection of the research with academic programs, plans, themes. The research has been carried out according to the priority direction defined by the Law of Ukraine number 3.5 "About priority directions of development of science and technology". "Science about life, new technologies in preventing and treating common diseases" on the topic "Traditional and non-traditional methods of physical rehabilitation for diseases of various body systems and musculoskeletal system injuries of individuals with various degree of fitness." State registration number - 0111U000194.

Objective: to reveal the attitude of reproductive aged women towards a healthy lifestyle using screening research.

Materials and methods. To study reproductive aged women's attitude towards a healthy lifestyle, the screening, based on the result of the questionnaire, has been carried out. We used the results of the questionnaire "Subjective evaluation of lifestyle and physical health" developed by Professor G. S. Nikiforov [7].

With the help of the key to the questionnaire, coarse result is converted into points. After summing all points we have made a conclusion about women's lifestyle in both groups according to the following scale:

88-60 points: Perhaps even unconsciously - you lead a healthy lifestyle.

59-50 points: Your attitude towards healthy lifestyle can be assessed as a good one.

49-35 points: Your attitude towards healthy lifestyle can be assessed as satisfactory. Think about something you can change.

30 points or less: your habits and behavior are far from healthy lifestyle, you neglect your health.

Results and discussion. 68 women took part in interviewing, 1st group aged 18-25 years (34 persons), 2nd group aged 26-35 years (34 persons).

Table 1

The results of the survey of women in both groups (n = 68)

The question: Can you relax in stressful situations without using alcohol, smoking or pills:	
1 group	2 group
yes - 45%, seldom - , no -	yes - 51%, seldom - , no -
The question: How much does your actual weight exceed an adequate one?	
4-10% - 28%; not more than 3% - 60%; less than 4-10% - 12%	Exceeds more than 50% - 5%; 15-24% - 35%; 4-10% - 30%; not more than 3% - 25%, less than 4-10% - 5%
Do you use any method of health improvement in every day life?	
Yes, regularly – 15%, yes, but not regularly– 65%, no – 20%	Yes, regularly – 10%, yes, but not regularly – 55%, no – 35%
How many times a week do you do physical training for 20 minutes or more?	
3 times – 15% 2 times - 65%, sometimes – 20%	3 times – 3% 2 times - 32%, sometimes – 65%
How long do you sleep (a day)?	
5-6 hours – 32%, 7-8 hours – 48%, 9-10 hours – 20%	5-6 hours – 69%, 7-8 hours – 28%, 9-10 hours – 3%
How often do you eat during the day?	
3-4 times – 75%, 2 times – 25%, once - 0	3-4 times – 50%, 2 times – 39%, once - 11%
How many times a week do you have breakfast?	
never – 11%, from time to time 28%, every day – 61%	never – 19%, from time to time – 28%, every day – 53%
How often do you miss classes because of illness?	
Get ill very seldom, once every few years – 20%, Get ill 1-2 times a year – 50%, Get ill every half a year – 30%	Get ill very seldom, once every few years – 30%, Get ill 1-2 times a year – 50%, Get ill every half a year – 20%
How often do you smoke?	
never – 60%, very seldom, not more than 1-2 times a month – 10%, sometimes (socially) -30%	never – 60%, very seldom, not more than 1-2 times a month – 12%, sometimes (socially) -15%, every day, 5-6 cigarettes a day – 8%, every day, half or a pack of cigarettes a day – 5%
How often do you drink alcohol?	
never – 35%, 50-70 g dry or strong wine once a week – 23%, very seldom, not more than 50 g of strong drinks 1-2 times a month – 31%, several times a month but a lot – 11%	never – 20%, 50-70 g dry or strong wine once a week – 60%, very seldom, not more than 50 g of strong drinks 1-2 times a month – 20%,

After analyzing the results of the questionnaire, we carried out a screening analysis of the subjective evaluation of lifestyle and physical health of women with the help of the above scale, from which the conclusion about both groups women's attitude to a healthy life style can be made.

So, in first group of women aged 18-25 years, 64 % got 88-60 points, 18% - 59-50 points, 9% - 49-35 points, and 9% - less than 30 points.

In the 2nd group (26-35 years), 42% of women got 88-60 points, 33% got 59-50 points, 17% of women – 49-35 points and 8% of the women - 30 or less points (pic .1).

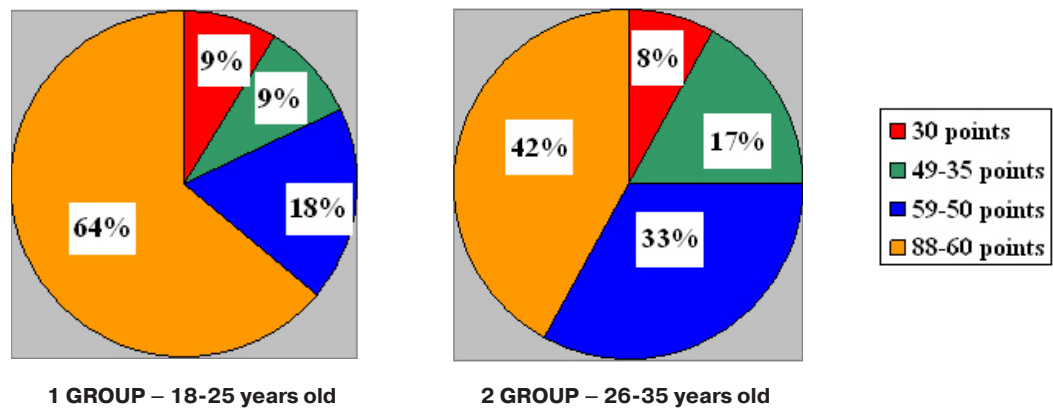
Having carried out the screening, we can conclude that only 64% of women in the first group and 42% of women in the second group lead a healthy lifestyle and their health can be assessed as good.

The results of 18% of women in the 1st group and 33% of women in the 2nd group say that the state of health is still good and the way of life close to healthy.

The state of health of 9% of women in the 1st group and 17% of women in the 2nd group can be assessed as satisfactory, but some changes in lifestyle are required.

And the attitude to the healthy lifestyle of the 9% of women 18-25 years old and 8% of women 26-35 years old can be assessed as satisfactory, so, these women neglect their own health.

Conclusion: From the position of screening research discussed above, the following data has been obtained: 64% of



Pic. 1. Both group women's evaluation of their health

women aged 18-25 years and 42% of women aged 26-35 years, lead a healthy lifestyle, but unfortunately in both groups there are 8-9% of women who neglect their health, what may affect the level of reproductive health, clinical and social prognosis of each of them in the future.

Women's reproductive health is an important part of general health and a health potential of nation-building, so preserving and developing as well as promoting a healthy lifestyle is a highly valuable aspect of life.

Prospects for further research: associated with the development of individual health programs for women, considering risk factors and age.

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The influence of visual impairment on separate indicators of a functional condition of touch systems of pupils of middle classes

Abstract. Purpose: to define and to compare separate indicators of a functional condition of touch systems of pupils of middle classes with visual impairment and their contemporaries with normal vision. **Materials and Methods:** pupils of middle classes with visual impairment and pupils of middle classes with normal vision took part in the research. During the research such methods were applied: analysis and synthesis of references, perimetry, determination of visual acuity by means of a special table, acumetry, esthesiometry, determination of resistance of a vestibular mechanism to rotary loadings, methods of mathematical statistics. **Results:** the analysis of separate indicators of a functional condition of visual, acoustical, vestibular and tactile analyzers of pupils with visual impairment and without them is carried out. **Conclusions:** it is established that the studied indicators of a functional condition of touch systems at pupils of middle classes with visual impairment are better, than at their contemporaries with normal vision.

Keywords: a functional condition of touch systems, pupils of middle classes, visual impairment.

Introduction. Sense organs of a person are of great importance for the activity. By means of them it is learned not only the environment and those changes which in it happen, but also some processes in a human body. Functions of the majority of analyzers are of rather great importance for classes by physical exercises. However the most significant among them is the visual analyzer by means of which a person receives about 90% of information on the environment. The performance of exercises is impossible without a normal functioning of motive, visual, acoustical, vestibular and tactile analyzers [3].

Visual impairments detain the formation of movement skills, conduct to considerable decrease in physical and informative activity, violations of the correct pose during walking and run. Works of many researchers devoted to a question of a functional condition of the visual analyzer [1; 2; 5] in which it is established that physical exercises positively influence a functional condition of the visual system promote the prevention of visual fatigue and prevent violations of a visual function.

The development of separate analyzers passes not at the same time. The first among them structures of the vestibular analyzer ripen, then – olfactory, flavoring and tactile, after all – acoustical and visual. The development of functions of analyzers in a bigger measure depends on education and study of a child. According to V. D. Glebovsky (1988), the structural and functional development of the majority of analyzers is the share of the middle school age. At this age functions of touch systems reach a high level, come nearer to adult's indicators, remaining thus rather labile [9].

In knowledge of the environment, spatial and social orientation, hearing is of great value for blind and visually impaired. The increase of acoustical sensitivity at violation of sight arises due to more active operation of an acoustic analyzer in conditions which change, and are a consequence of a strengthened training orientations and studies [6; 8].

Children with visual impairments often use sound information. There is a sound on the basis of which it is possible to make an idea of a subject in the majority of exercises at interaction with a support or a subject. Sounds are used in quality prearranged signals which change visual representations. The possibility of regulation of speed of movements, an assessment of duration, frequency and a rhythm of separate movements are connected with a function of an acoustic analyzer.

The vestibular analyzer at visually impaired receives an additional information from different statoreceptors. It informs a brain on a position of a body in a space of rather surrounding subjects and, if necessary, it increases static sensitivity. At children who can see badly, the vestibular mechanism develops under other equal conditions, it is better, than in those who can see normally.

Visual impairments in the course of a spatial orientation compensate the increase of different types of sensitivity; ability to differentiate subtly an external influence considerably. It should be noted that a spatial orientation is provided with a joint activity of visual and vestibular touch systems in normal conditions [7].

The tactile analyzer is a powerful mean of compensation of weak vision. Tactile receptors by the mechanism of conditional communications join in the analysis of movements and this functional communication is a physiologic basis of the complex kinetic analysis of movements [3].

However in available to us literature few works are found [4; 10], devoted to the research and the comparison of a functional condition of touch systems of pupils of middle classes as with visual impairment, and such who have no deviations in functioning visual to the analyzer, as became a reason for studying of this problem.

Purpose: to define and to compare separate indicators of a functional condition of touch systems at pupils of middle classes with visual impairment and their coevals who can see normally.

Material and methods of the research: the analysis and synthesis of references, perimetry, determination of visual acuity by means of a special table, acumetry, esthesiometry, determination of resistance of a vestibular mechanism to rotary loadings, methods of mathematical statistics.

Pupils of middle classes with visual impairment and pupils who can see normally took part in the research.

The following violations of visual perception were observed at pupils with visual impairment:

- a child saw a subject, could describe its separate signs, but couldn't call and characterize this subject;
- a narrowing of a volume of visual perception;
- a loss of ability to distinguish a color.

Results of the researches and their discussion. During the research it was established that visual acuity at pupils

who can see badly, fluctuated in the wide range (from 0,09 to 0,4 units.) also depended on a disease, but not on an age and a sex of a child.

The research of visual acuity of pupils without deviations in functioning of the visual analyzer testifies to normal visual acuity both right eye, and left eye at pupils of the 5-6th classes and boys of the 7-8th classes, girls of the 7-8th classes and pupils of the 9th classes have a visual acuity both eyes the little lowered.

Comparison of visual acuity of boys and girls found out that boys have the best indicators in general. The exception is made by results of pupils of the 5-6th classes where some best visual acuity is noted at girls, but reliability of differences between indicators is absent ($p>0,05$).

With the age visual acuity both right eye, and left eye decreases, but reliability of differences between indicators isn't observed ($p>0,05$).

Indicators of a peripheral field of vision decided on the help of a perimeter of Forster. Their analysis at visually impaired pupils testifies that the widest borders of an image are observed by the right eye at pupils of the 6-9 classes, and the left eye – at boys of the 6th and 9th classes and girls – the 8th and 9th classes. The volume of a peripheral field of vision at boys and girls is almost identical. At the same time indicators of a peripheral field of vision of the investigated are much lower than the standard.

Borders of a field of vision of pupils, who can see normally, are also slightly lower than norm. The most considerable indicators of a peripheral field of vision both right eye, and left eye are observed at boys of the 8th class and girls of the 9th class. Comparing indicators of borders of a field of vision in the age aspect, it should be noticed that external borders of fields of vision of the right and left eyes at boys and girls extends with the age, and dynamics of indicators of others borders has a wavy character.

Indicators of a functional condition of the vestibular analyzer were defined by the results of deviations in walking before and after rotations in the chair Barany. The analysis of results of pupils with visual impairment to rotations testifies that the best are at boys of the 8th class ($17,9\pm 9,8$ sm) and at girls of the 7th class ($16,8\pm 4,9$ sm). The definition of indicators of firmness the vestibular analyzer after rotary loadings showed that the least impressionable to them boys of the 9th class ($84,8\pm 11,3$ sm) and girls of the 7th class ($67,6\pm 27,8$ sm). The comparison of results of boys and girls testifies that girls more resistant to rotary loadings, than boys.

The analysis of indicators of pupils with normal sight showed that to rotations the best they are at children of the 7th class ($20,89\pm 0,85$ sm) and girls of the 9th class ($18,64\pm 1,08$ sm). After rotations the best indicators were observed both at boys, and at girls of the 6th class ($97,17\pm 3,08$ sm and $88,31\pm 4,14$ sm respectively). Comparing indicators of firmness of the vestibular analyzer of pupils of middle classes in a sexual aspect, it should be noticed that results of deviations in walking both before and after vestibular irritation at girls is better, than at boys.

At the same time the research showed that pupils of middle school age with visual impairment in comparison with coevals without the noted deviations show a big resistance to rotary loadings.

Indicators of the tactile sensitivity are decided on finger-tips by means of the esthesiometry method on use of compasses of Weber. The analysis of a spatial threshold of the tactile sensitivity testifies that the best is at boys of the 6th class ($1,3\pm 0,5$ mm) and at girls of the 7th class ($1,2\pm 0,6$ mm). It should be noted that in 5–6 classes finger-tips are more sensitive at boys, and in 7–9 classes – at girls. In our opinion, it is explained that girls of this age in everyday life carry out a large number of the exact movements connected with a small motility of hands.

The analysis of results of the tactile sensitivity of pupils who can see normally, testifies that indicators is slightly better than at girls, however these differences have no reliable character ($p>0,05$). The best indicators of a threshold of the tactile sensitivity are recorded at boys and girls of the 8th class.

The age dynamics of the tactile sensitivity has a wavy character both at boys, and at girls. The reliability of differences is absent ($p>0,05$).

The results of the research testify that the tactile sensitivity of finger-tips is much higher at pupils with visual impairment, than at their coevals which have no deviations in functioning of the visual analyzer.

Indicators of a functional state of the acoustical analyzer are decided by results of duration of audibility of a sound at the air conductivity on application to a tuning fork. The most considerable indicators both right ear, and left ear, were noted at boys 9 and girls of 7 classes ($22,9\pm 1,1$ s and $25,7\pm 2,0$ s; $22,9\pm 2,63$ s and $25,9\pm 1,2$ s respectively). It should be noted that sound audibility duration indicators at the air conductivity are higher at girls, than at boys.

The most considerable indicators of duration of audibility of a sound at pupils who can see normally, recorded by the right ear at pupils of the 8th class ($6,94\pm 0,12$ s and $6,85\pm 0,09$ s), the left ear at pupils of the 9th class ($6,95\pm 0,08$ s and $6,89\pm 0,07$ s).

The comparison of results of the air conductivity in a sexual aspect says that they are a little higher at boys, than at girls. The exception is made by indicators of pupils of the 5th classes where results of girls are higher.

Sound audibility duration by the right and left ear increases at boys and girls with the age. The reliability of differences is observed only in results of pupils of 7-8 classes ($p<0,001$).

Sound audibility duration in many respects depends on frequency to a tuning fork therefore standard indicators exist for each separate device. In our case results of pupils were compared to defects of sight with results of pupils who can see normally. The comparison of indicators testifies to longer audibility of a sound at the air conductivity at pupils with defects of sight.

Thus, the results of the research showed that deviations in functioning of the visual analyzer influence separate indicators of a functional condition of other touch systems and promote the improvement of their work. It is necessary to notice that the best indicators of a functional condition of touch systems at pupils, who can see normally, are observed at boys and girls of the same age. The best indicators of the studied functions are recorded in the 7th class At girls with visual impairment, at boys – in the 6, 8 and 9 classes.

Conclusions:

1. The analysis of references testifies that there is not enough attention is paid to a problem of a functional condition of touch systems of pupils of middle classes both with visual impairment, and without.

2. The analysis of separate indicators of a functional condition of touch systems of pupils with visual impairment and pupils who can see normally in a sexual aspect showed that they are better at girls, than at boys.

3. At pupils with visual impairment, the best indicators of resistance to rotary loadings were recorded at boys of the 9 class and girls of the 7 class, the tactile sensitivity of finger-tips – at boys 6 and girls of 7 classes and duration of audibility of a sound at the air conductivity – at boys 8 and girls of 7 classes.

4. At pupils who can see normally, the best indicators of resistance to rotary loadings were observed at boys and girls of the 6th class, the tactile sensitivity of finger-tips, – boys and girls of the 8th class and duration have sound audibility at the air conductivity – boys and girls have the 8–9 classes.

5. The results of the research testify that resistance of the vestibular analyzer to rotary loadings, the tactile sensitivity of finger-tips, sound audibility duration at the air conductivity at pupils with visual impairment is much better, than at their coevals who can see normally.

Prospects of the subsequent researches. It is planned to investigate the influence of change of a functional condition of vestibular, acoustical and tactile analyzers on functioning of the visual analyzer of pupils who can see bad.

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Dynamics of physical preparedness of runners on middle distances who live in various climatic conditions

Abstract. Purpose: to study the dynamics of physical preparedness of runners on 1500 m who live in various climatic conditions.

Material and Methods: 20 qualified runners on middle distances who were divided into two groups took part in the experiment. The first group included 10 runners on 1500 m which are mainly living on the plain, the second – 10 runners on 1500 m which are mainly living in the mountain district. During the research the following methods were used: analysis and synthesis of references, testing, and methods of mathematical statistics. **Results:** indicators are presented and the analysis of the level of physical preparedness of runners on 1500 m is carried out, living in various climatic conditions in the preparatory and competitive periods of a year macrocycle. **Conclusions:** it is established that the level of physical preparedness of runners living in various climatic conditions changes not equally during a year macrocycle.

Keywords: various climatic conditions, runners on middle distances, physical qualities, physical preparedness.

Introduction. The productivity of long-term preparation in run on middle distances depends on the interrelation of all types of preparedness. In modern scientific and methodical literature enough attention is paid to the structure of construction, the content of the training process and changes happening in organisms of the sportsmen specializing in types of endurance in the conditions of midlands and highlands [1–3; 6]. Most fully, in our opinion, the content of the training process in the conditions of mountain preparation at the sportsmen specializing in different types of sport is considered in the works of F. P. Suslov, E. B. Gippenreyter [2], V. N. Platonov [1]. At the same time the researchers pay not enough attention to physical preparedness of sportsmen, as one of the components of sports result. In available to us literature of the last years practically there aren't almost researches devoted to the development of physical qualities of sportsmen in the conditions of highlands and to change of their level in the course of further training.

It should be noted also that fact that a question of influence of training in mountain conditions on preparedness and a functional condition of an organism of the qualified runners on middle distances living in various climatic conditions is remain unexplored.

In available to us literature the researches of the Chinese and Japanese experts were found which are devoted to reactions of an organism of sportsmen to conditions of midlands and highlands, and also intensity of their individual adaptive reactions.

So, the researches of change of HR during trainings in highlands at the fast runners living in different climatic conditions (in highlands and on the plain), testify that the maximum HR decreased irrespective of accommodation conditions after the implementation of the training program in highlands at all examinees on the plain. The researchers note that HR decreases at the sportsmen living on the plain at rest after a long-term stay in mountains. A step change of height at which trainings were carried out (a rise from 2366 m on 3200 m and return on 2366 m), was a stress for an organism and promoted an increase of working capacity at the height of 2366 m at the fast runners living on the plain [4].

Tsyui Chengang and Pu Feng [5] investigated the structure of muscles of the sportsmen specializing in the types of endurance living in various regions of China. Results of the research allowed noting that the efficiency of sportsmen is in direct dependence on "coefficient of muscles" the greatest values of which are recorded at the sportsmen living in Tibet and Gansu.

The incidental researches devoted to a reaction of an organism of the sportsmen who are mainly living in various climatic conditions don't give the chance to create a complete idea of influence of training in mountain conditions on the level of their preparedness and, as a result, on result of the competitive activity.

The objective of the research: to study a dynamics of physical preparedness of runners on 1500 m living in various climatic conditions.

Materials and methods of the research. The researches were conducted in People's Republic of China on the bases of Chenggung (mountain conditions) and Chundzhu (plain). 20 qualified runners on middle distances participated in the experiment which was divided into two groups. The first group included 10 runners on 1500 m which are mainly living on the plain, the second – 10 runners on 1500 m which are mainly living in the mountain district. The sportsmen who were taking part in the experiment, trained according to one program.

During the research the following methods were used: analysis and synthesis of references, testing, and methods of mathematical statistics.

Results of the research and their discussion. The year cycle of training of runners represented the one-cyclic structure of creation of the training process with the long competitive period, lasting 5 months that is connected with a large number of competitions in which examinees had to participate.

3 educational training camps were planned in the conditions of midlands and highlands in a macrocycle of preparation. The first collecting in highlands was carried out lasting 21 days in December. The volume of running loadings made 300 km. Much attention at this stage of preparation was paid to the increase of the level of power and high-speed and power preparedness.

The following stage of mountain preparation was hold in February – March and assumed 28-days stay in mountains, then 7-days – on the plain and 14-days – at the height of 800 m above the sea level. The special attention was paid to the development of power endurance, force and flexibility.

The last stage of preparation was held in mountain conditions in May, just before the beginning of the competitive period, and lasted 14 days. Sportsmen purposefully developed high-speed abilities and high-speed endurance.

The level of physical preparedness of sportsmen was defined three times during a macrocycle. The primary testing was held in September, 2013 before the preparatory period, repeated – in May, 2014 right after the end of collecting in mountains. One more testing – was held in September, 2014, after the end of a competitive season for the definition of influence of competitive loads of the level of physical preparedness of runners on 1500 m.

Results of the testing of runners for 1500 m which are mainly living in plain conditions are presented in tab. 1.

The data presented in table 1 testify that the level of all tested qualities of runners considerably and authentically ($p < 0,001$) increases by the end of the preparatory period.

The comparison of indicators of the second and third tests gave the chance to establish that the level of results in run on 100 m, run by jumps of 100 m (quantity of steps), bending and extension of hands in an emphasis lying, lifting of a trunk in a set for 1 min. and long jumps from a place practically didn't change ($p > 0,05$) during the competitive period.

Indicators authentically decreased ($p < 0,01-0,001$) in special endurance, endurance and high-speed and power endurance tests (run by jumps – performance time) by the end of the competitive period.

Only indicators of force of muscles of an abdominal tension authentically increased throughout the whole training macrocycle.

Table 1

Indicators of the level of physical preparedness of runners on 1500 m which are mainly living in conditions of the plain (n=10)

Tests	Period of holding			t, p	1,2	2,3	1,3
	09.2013	05.2014	09.2014				
	$\bar{X} \pm m$						
Run of 100 m	11,66±0,02	11,53±0,019	11,52±0,015	t	10,91	0,54	8,57
				p	0,001	0,601	0,001
Run of 1200 m	184,67±46,6	180,98±27,0	182,16±29,9	t	5,58	3,39	4,35
				p	0,001	0,01	0,001
Run of 3000 m	506,77±45,67	498,01±16,71	500,24±29,09	t	9,31	2,86	10,16
				p	0,001	0,01	0,001
Run by jumps of 100 m (quantity of steps)	40,9±0,77	39,5±0,72	39,3±2,01	t	6,33	1	5,24
				p	0,001	0,343	0,001
Run by jumps 100 m (time)	22,46±0,37	21,63±0,26	22,11±0,3	t	6,1	4,76	3,24
				p	0,001	0,001	0,01
Bending and extension of hands in an emphasis lying	55,7±0,9	57,1±0,98	56,9±1,88	t	4,12	1	3,09
				p	0,01	0,343	0,01
Lifting of a trunk in a set in 1 min.	49,7±0,9	51,1±1,88	51,4±2,27	t	5,25	1,41	5,07
				p	0,001	0,193	0,001
Long jump from a place	2,77±0,007	2,89±0,008	2,91±0,006	t	5,79	1,96	6,38
				p	0,001	0,081	0,001
Trunk inclination forward from sitting position	18,87±0,39	19,34±0,35	20,0±0,21	t	7,64	5,57	7,99
				p	0,001	0,001	0,001

Indicators of the level of physical preparedness of runners on 1500 m which are mainly living in mountain conditions are presented in tab. 2.

Results of runners on 1500 m considerably and authentically ($p < 0,001$) increased in all carried-out tests by the end of the preparatory period. The exception makes the result in run on 1200 m characterizing the level of special endurance of sportsmen. Indicators of special endurance under the influence of the offered program of training practically didn't change during all macrocycle ($p > 0,05$).

Comparing results in the tests at the end of the preparatory and competitive periods, we come to a conclusion that all of them are rather stable. Only results in a set in 1 min. authentically increase in lifting of a trunk during the whole year of macrocycle of training.

The comparison of dynamics of physical preparedness of the runners on middle distances who live in various climatic conditions revealed the distinctions which are connected, in our opinion, with conditions of an accommodation of sportsmen. So, at the runners living in mountain conditions, the acquired in the preparatory period level of physical preparedness remains until the end of the competitive period practically without changes.

At the runners who are mainly living on the plain, the level of indicators of special endurance, endurance and high-speed and power endurance by the end of the competitive period considerably decreases. In our opinion, it is connected with that inclusion in the program of training of sportsmen of stages of mountain preparation promotes the increase of level of these qualities. The after-effect of a natural hypoxia decreases by the end of the competitive period that leads to the decrease in indicators of the above noted abilities and, finally, results in the competitive exercise.

Comparing changes of high-speed abilities at examinees, it should be noted that, their level is stable throughout the whole competitive period at the runners who are mainly living on the plain; results in run authentically decrease by 100 m ($p < 0,001$) at the athletes who are mainly living in mountain conditions by the end of the competitive period. In our opinion, it is a consequence of adaptive reactions of an organism to environmental conditions.

It should be noted that the runners who are mainly living on the plain had more significant changes of indicators of

Table 2

Indicators of the level of physical preparedness of runners on 1500 m which are mainly living in mountain conditions (n=10)

Tests	Period of holding			t, p	1,2	2,3	1,3
	09.2013	05.2014	09.2014				
	$\bar{X} \pm m$						
Run of 100 m	11,72±0,04	11,54±0,03	11,64±0,02	t p	6,61 0,001	4,67 0,001	3,24 0,01
Run of 1200 m	184,62±44,0	183,26±26,8	183,39±27,3	t p	1,56 0,159	0,31 0,764	1,54 0,159
Run of 3000 m	508,52±29,25	501,98±16,97	502,38±13,99	t p	8,73 0,001	0,50 0,628	6,03 0,001
Run by jumps of 100 m (quantity of steps)	41,1±1,21	39,5±0,94	39,6±0,93	t p	7,24 0,001	0,56 0,591	4,39 0,01
Run by jumps 100 m (time)	22.7±0,41	22,25±0,38	22,33±0,37	t p	4,89 0,001	0,74 0,478	3,66 0,01
Bending and extension of hands in an emphasis lying	55,2±0,4	56,8±0,62	56,5±0,94	t p	7,24 0,001	1,15 0,279	3,55 0,01
Lifting of a trunk in a set in 1 min.	49,5±0,94	50,7±0,9	51,3±2,23	t p	4,13 0,01	1,96 0,081	5,01 0,001
Long jump from a place	2,76±0,006	2,86±0,004	2,87±0,005	t p	7,06 0,001	0,37 0,721	4,57 0,001
Trunk inclination forward from a sitting position	18,47±0,34	19,52±0,35	20,18±0,08	t p	10,25 0,001	4,45 0,01	11,12 0,001

special endurance, endurance and high-speed and power endurance in comparison with the sportsmen who are mainly living in mountain conditions that, in our opinion, is caused by influence of a natural hypoxia.

Thus, the dynamics of the level of physical preparedness in a year macrocycle isn't identical at the sportsmen living in various climatic conditions on condition of use by them identical programs of preparation,.

Conclusions:

1. The analysis of scientific and methodical literature showed that the problem of physical preparedness of the qualified runners on middle distances living in various climatic conditions is practically not studied.

2. The runners on middle distances, mainly living on the plain, have more considerable gain of indicators of special endurance, endurance and high-speed and power endurance in comparison with the sportsmen who are mainly living in mountain conditions.

3. Indicators of special endurance, endurance and high-speed and power endurance of the runners on middle distances who are mainly living on the plain by the end of the competitive period decreased authentically ($p < 0,01 - 0,001$).

4. Results in run on 1200 m characterizing the level of the development of special endurance of the sportsmen who are mainly living in mountain conditions during the whole year macrocycle remained almost invariable.

Prospects of further researches. Further researches are supposed to be devoted to studying of changes of physiological indicators at the runners on middle distances living in various climatic conditions under the influence of trainings in midlands and highlands.

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Features technical and tactical training of volleyball players of high class of different roles

Abstract. Purpose: to determine the effectiveness of competitive activity of highly skilled players in different roles. **Material and Methods:** the study used statistical data of major international competitions: the Olympic Games – 2012, the World Cup – 2010, 2014, European Championship – 2010–2014 World League – 2010–2014. A total of 130 games was analyzed. Methods used: analysis and compilation data of special scientific and methodical literature, analysis of competitive activity of volleyball players of high class, pedagogical observation, methods of mathematical statistics. **Results:** it was found that the most effective of attacking actions during one game performed by highly skilled volleyball players of the world, where players first rate of the attack wins in the fourth part 4,2% balls, the second player tempo attack – 4,5%, «diagonal» – 5,1%. **Conclusion:** it is proved that the greatest indicator of the effectiveness of competitive activity has a high-class volleyball players that win throughout the game the second player tempo attack 22,1% of balls, «diagonal» – 18,8%, the first rate players – 16,3%.

Keywords: technical and tactical actions, competitive activity, efficiency, highly skilled volleyball players.

Introduction. Current state of and prospects for the development of world volleyball determined by the level of perfection of technical and tactical training of volleyball players of high class [1–3, 11, 12]. Modern trends in the world of volleyball indicate that significant changes have occurred in the technical and tactical training of volleyball players of high class, which is concluded in universalization and specialization of players and is characterized primarily by a rational and high-speed implementation of technical and tactical actions in attack [5, 7, 10].

Improving the efficiency of competitive activity by improving technical and tactical actions of volleyball players of high class depends on science-based system for monitoring and analysis of sports training. In the general theory of training of athletes [8] developed an integrated approaches to solving the problem of increasing the efficiency of competitive activity in sports, including volleyball. According to experts [4, 8, 9], necessary to focus on improving the efficiency of technical and tactical actions in attack and defense (group and individual) technical and tactical actions of players of high class, as well as the improvement and development of techniques for the analysis and interpretation of the results of competitive activity.

A.V. Belyaev [2] states that a significant place in the competitive activities of highly skilled volleyball players given to service and receiving the ball with the serve, that affects the organization of effective combinatorial circuits play in attack of rivals. B.A. Artemenko [1] on the basis of video analysis of competitive activity of highly skilled volleyball players of Ukraine and the strongest teams of the world set features tactical constructions in the attack of volleyball players of high class, as well as the frequency of the power service and plans to players of different roles. In-depth analysis of the components of technical and tactical activities in volleyball contained in research A.V. Verteliy [4] E.P. Volkov [5], P.V. Pustoshilo [9] based on the use of pedagogical monitoring of competitive activities of players in volleyball. E.J. Doroshenko [6] in the materials research underscores the need for quantitative and qualitative analysis of indicators of competitive activity in the preparation of players in sports games, including volleyball, which will increase the effectiveness of technical and tactical actions in the attack in different structural formations a year macrocycle.

Currently, in the modern special scientific and methodical literature is almost no data on issues dealing with the generalization of the dynamics of indicators of competitive activity of volleyball players of different roles. Thus, the solution of problem of performance technical and tactical actions in the attack of volleyball players of high class is relevant in scientific terms. To improve the technical and tactical training in volleyball is necessary to use objective indicators of implemented gaming combinations in attack with the help of a comparative analysis of the games of the strongest volleyball players of the world and Ukraine.

Communication of studies with scientific programs, plans, themes. Work is executed in accordance with the «Consolidated plan of research in the field of physical culture and sports for 2011-2015». Ministry of Ukraine for Family, Youth and Sports on themes 2.16 «Improving means of technical and tactical training of qualified athletes using modern technology measurement, analysis and simulation of movements» (state registration number 0110U002416).

The purpose of research – to determine the efficiency of competitive activity of highly skilled volleyball players of different roles.

Material and methods: analysis and compilation data of special scientific and methodical literature, analysis of competitive activity volleyball players of high class, teacher observation, methods of mathematical statistics.

Teacher observation for the competitive activity of highly skilled volleyball players was performed using video analysis of games of the World League volleyball 2010–2014, The World Cup – 2010, 2014, Olympics Games – 2012., European Championship – 2012–2014. Teacher observation for the competitive activity of highly skilled volleyball players of Ukraine was performed by analyzing the competitive activities of athletes on Ukrainian championship in volleyball teams of the 2010–2014 Super League. A total of 130 analyzed games.

Results and discussion. Table 1 shows quantitative indicators of the balls won during one game by highly skilled volleyball players of the world and Ukraine, in the attack of the first pace on the official competition 2010 – 2014.

Analysis of competitive activity of highly skilled volleyball players, shown in Figure 1, allows us to conclude that the effectiveness of the attacking actions of the first pace players is crucial for competitive activity of highly skilled volleyball players of the world and Ukraine.

Table 1

Number of goals in attack von highly skilled volleyball players first temp attack for the results Official games 2010 – 2014

Team (number of games)	average values, the number of								Total
	1 part		2 part		3 part		4 part		
	\bar{X}	S	\bar{X}	S	\bar{X}	S	\bar{X}	S	
Highly skilled volleyball players of the world (n=60)	3,5	0,6	4,5	0,6	4	0,6	7,1	0,7	19,1
Yighly skilled volleyball players of the Ukraine (n=40)	2	0,3	3,2	0,3	3	0,3	3	0,5	11,2
Qualified volleyball players team «Burevestnik» (n=30)	2	–	3	0,03	2	0,1	3	–	10

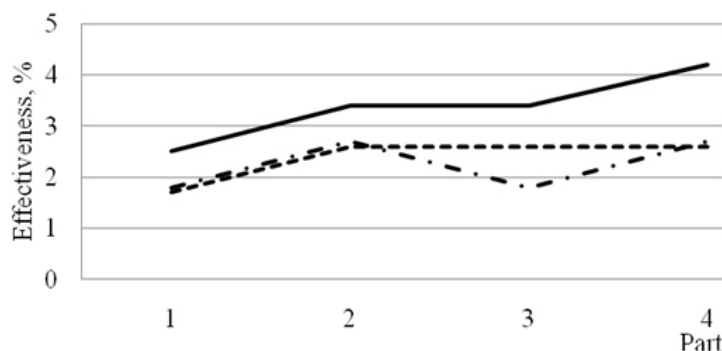


Fig 1. Performance indicators attacking actions qualified volleyball players (role – «central blocking») on the results of the won score in each part the game:

- – highly skilled volleyball players of the world;
 - - - - - – highly skilled volleyball players of the Ukraine;
 - · - · - · – qualified volleyball players team «Burevestnik»;
- 1, 2, 3, 4 – part the game.

The results of these studies show that the most effective of the attacking action of the players in first-tempo attacks are highly skilled volleyball players of the world, accounting for 16,3% in comparison with the Ukrainian athletes (team Super League Ukraine – 10%, «Burevestnik» – 9%). A characteristic feature of competitive activity of highly skilled volleyball players of the world and Ukraine is a gradual increase in the number of won balls by players of the first pace attack, unlike players on the team, «Burevestnik».

Thus, the greatest efficiency attacking actions of the players of this role have highly skilled volleyball players of the world observed in the fourth part (6%), the players of Super League teams in Ukraine – 2,6%. The effectiveness of action of the attacking players on the team, «Burevestnik» in the second and the fourth part of 2,7%. This is due to low levels of technical and tactical and psychological preparation for skilled volleyball players, which do not provide the effectively attacking actions of the players of this role.

Table 2 shows the quantitative indicators won balls by highly skilled volleyball players the second pace attack on the results of the official competition 2010 – 2014.

Table 2

The number of won balls in the attack of highly skilled volleyball players of the second tempo on the official Games 2010 - 2014 year

Team (number of games)	Average values, quantity								Total
	1 part		2 part		3 part		4 part		
	\bar{X}	S	\bar{X}	S	\bar{X}	S	\bar{X}	S	
Highly skilled volleyball players of the world (n=60)	4,3	0,7	6,1	0,8	5,5	0,7	10	1	25,9
Highly skilled volleyball players of the Ukraine (n=40)	3	0,3	4	0,4	3	0,4	4	0,7	14
Qualified volleyball players team «Burevestnik» (n=30)	4	0,1	2	0,3	4	0,1	5	0,1	15

The research results indicate that competitive activity has wavy character, the essence of which is to increase the number of attacking action in the fourth part highly skilled volleyball players of the world in relation to other parts to the game. The effectiveness of the attackers actions of highly skilled volleyball players of the world is 8,5% of the total number of actions performed by the attackers; highly skilled volleyball players of Ukraine - in the second and fourth part – 3,5%; qualified volleyball team «Burevestnik» observed increase of the number of attacking moves in the fourth part of – 4,5%.

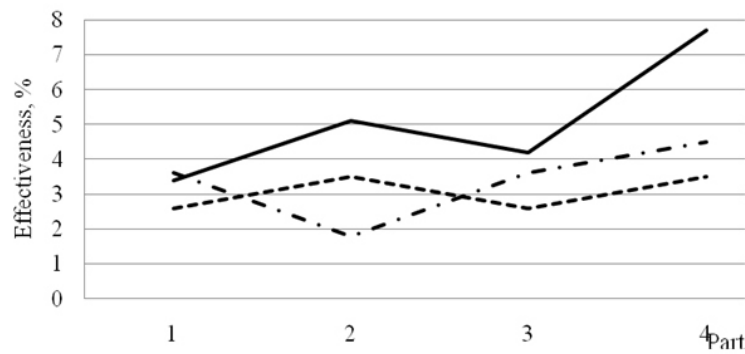


Fig. 2 Dynamics performance indicators attacking action highly skilled volleyball players of the second tempo on the results of the won score in each part the game:

- highly skilled volleyball players of the world;
 - - - highly skilled volleyball players of the Ukraine;
 - · - qualified volleyball players team «Burevestnik»;
- 1, 2, 3, 4 – part the game

Table 3 shows the quantitative indicators of won balls highly skilled volleyball players the second pace attack (role – «diagonal») on the results of the official competition 2010 – 2014.

Performance indicators (Fig. 3) in the second part of the study group of players, has most important: highly skilled volleyball players of the world – 5,8%, highly skilled volleyball players of Ukraine – 3,9% of skilled players on the team, «Burevestnik» – 4,5%.

In the fourth part of the game greatest indicator of the effectiveness of the attacking action belongs to the team of highly skilled volleyball players of the world – 3,4%, highly skilled volleyball players of Ukraine – 3,1%, qualified volleyball team «Burevestnik» – 2,7%, respectively.

Table 3

The number won balls in the attack of highly skilled Volleyball players of the second tempo (role – «diagonal») on the official Games 2010 - 2013 year

Team (number of games)	Average values, quantity								Total
	1 part		2 part		3 part		4 part		
	\bar{x}	S	\bar{x}	S	\bar{x}	S	\bar{x}	S	
Highly skilled volleyball players of the world (n=60)	4,6	0,6	6,8	0,7	5,6	0,6	5	1	22
Highly skilled volleyball players of the Ukraine (n=40)	4,5	0,2	4,5	0,3	5,5	0,4	3,5	0,4	18
Qualified volleyball players team «Burevestnik» (n=30)	3	0,2	5	0,1	5	0,1	3	0,1	16

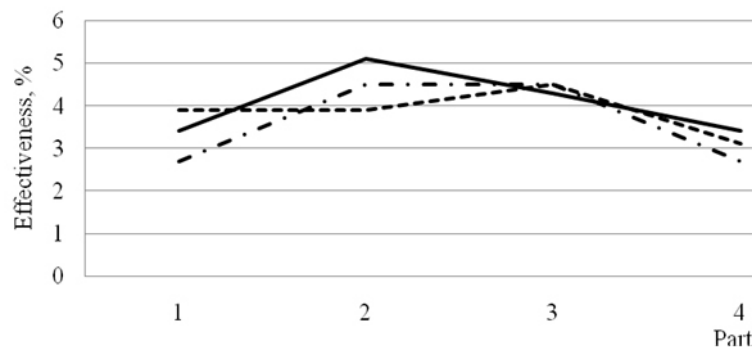


Fig. 3. Dynamics performance indicators attacking action highly skilled volleyball players (role – «dogravalny») on the results of the won score in each part the game:

- highly skilled volleyball players of the world;
 - - - highly skilled volleyball players of the Ukraine;
 - · - qualified volleyball players team «Burevestnik»;
- 1, 2, 3, 4 – part the game

A feature of competitive activity of the «diagonal» players in volleyball there is the use of the largest number of attackers blows, running from the back line of the playing court, with the greatest efficacy at highly skilled volleyball players of the

world in the second part – 5,1%, highly skilled volleyball players of Ukraine in the third part of the game – 4,8%, players command «Burevestnik» – 4,5%.

Obtaining objective information allows us to determine the effectiveness of attacking actions of the players of the first and second pace, the values of which are presented in Figure 4.

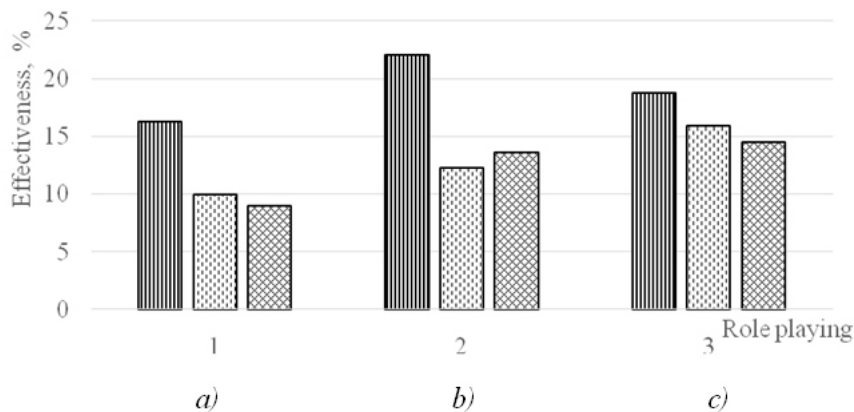


Fig. 4. The efficiency of competitive activity of highly skilled volleyball players on the official games 2010-2013r.: a) leading volleyball players of the world; b) highly skilled volleyball players of Ukraine; c) qualified players of the team Super League of Ukraine «Burevestnik»:

————— – players «central blocking»;
 - - - - - – players of the second tempo;
 - · - · - · – players «dogrovalny».
 1 – players «central blocking»; 2 – players of the second tempo; 3 – players «dogrovalny».

Pedagogical analysis of the effectiveness of technical and tactical actions in the attack, as well as to determine their efficiency in competitive activity of skilled volleyball players allow to state that the most effective attacking actions have «dogrovschiki», who perform the largest amount of technical and tactical actions. The effectiveness of the attacking actions of this role players at highly skilled volleyball players of the world is 22,1%, from highly skilled volleyball players of Ukraine – 12,3%, from the players on the team, «Burevestnik» – 13,6%.

A feature of the «diagonal» players is the use of the to a greater extent attacking actions carried out from the back of the line of volleyball courts, which brings the most benefit. The contribution of the players of this role in the effectiveness of competitive activity of highly skilled volleyball players of the world – 18,8%, in volleyball teams Super League Ukraine – 15,9%, the athletes teams «Burevestnik» – 14,5%, respectively.

Also, we have the tendency to increase the number of attack first-tempo players in the teams of highly skilled volleyball players in the world, where the indicators of efficiency is 16,3%, highly skilled volleyball players Ukrainian win 10% attacks in of the total number of attacking actions, qualified team players «Burevestnik» at 9% cases.

Conclusions. Analysis of these data allows to reveal certain patterns that exist in competitive activity highly skilled volleyball players of different roles:

- in the team of highly skilled volleyball players of the world, the role «central blocking» the most efficient of attacking action has in the fourth part of the game is 4,2%, in highly skilled volleyball players of Ukraine – 2,7% of skilled volleyball team «Burevestnik» – 2,6% of the total the number of balls won;
- high efficiency attacking action of «doigrovschik» role is performed in the fourth part of the game highly skilled volleyball players of the world – 7,7%, highly skilled volleyball players of Ukraine – 3,5%, team players «Burevestnik» – 4,5% of the total number of balls won;
- high efficiency attacking action the players of «diagonal» role has in the second part of the game where in the best volleyball teams of the world the highest indicator of ball won from the attacking actions of 5,1%, highly skilled volleyball players of Ukraine - 4,5%, qualified players on the team, «Burevestnik» value – 4,5%;
- the greatest contribution to the effectiveness of competitive activity have «dogrovschiki»: highly skilled volleyball players of the world – 22,1%, highly skilled volleyball players of Ukraine – 12,3%, qualified players on the team, «Burevestnik» – 13,6%.

Prospects for further research on this issue will be associated with the development of individual models of technical and tactical training of highly skilled volleyball players based on their playing specializations that will constitute the methodological basis of training and competitive activity of players in volleyball.

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Efficiency analysis of competitive activity of highly skilled basketball players at the stage of maximum realization of individual potential

Abstract. Purpose: to identify the factors of efficiency of competitive activity of highly skilled basketball players at the stage of maximum realization of individual potential. **Material and Methods:** in order to identify the factors that have supported the performance of Ukraine's male national team in the European Championship, data analysis and generalization of scientific and technical literature and online data, analysis of official protocols of competitive activities, analysis and generalization of best pedagogical practices, pedagogical supervision, methods of mathematical statistics were used. **Results:** the efficiency of competitive activity of basketball players was analyzed using such indicators as team roles, won and lost matches, scored and missed points, technical, tactical and age indicators. **Conclusions:** the factors of efficiency of competitive activity of highly skilled basketball players at the stage of maximum realization of individual potential were identified with regard to age indicators.

Keywords: basketball, championship, victory, competition activity, indexes.

Introduction. Problems of long-term training of highly skilled basketball players and ways of their solutions are found in the center of attention of experts as a result of a continuous increase of competition at the level of leading national and club teams. Experts-specialists and scientists allocate, as one of leaders, a problem of determination of the efficiency of the competitive activity and the analysis of its technical and tactical indicators. It is caused by a considerable influence of the above-mentioned factors on the productivity of the competitive activity and the achievement of high sports results. Definitions and the analysis of indicators of efficiency of the competitive activity of highly skilled basketball players at a stage of the maximum realization of individual opportunities are especially actual. Throughout this stage of long-term training indicators of sports skill and preparedness reach the greatest values that create prerequisites for the achievement of maximum sports results.

The modern views on a periodization of long-term preparation stated by V. Platonov, 2013 [8] allow to note that basketball belongs to a group of sports which differ from others in the existence of a large number of factors which define productivity of the competitive activity. Besides, basketball competitions take a place with high emotionality, application of a wide range of means and methods of preparation that allows for a long time (10-15years old) to have the high level of "sportswear", what close to optimum values, and to provide high sports results [10].

A basis of the theory of long-term training are the special principles formulated by V. Platonov, 2014 [9]: 1) an orientation to the highest achievements; 2) a profound specialization; 3) a unity of the general (fundamental, basic) and special preparation; 4) a continuity of the training process; 5) a unity of a gradual increase in loadings and tendency to maximum loadings; 6) a waviness and variety of loadings; 7) a recurrence of the process of preparation; 8) a unity and an interrelation of the competitive activity and preparedness.

Characterizing the structure of long-term preparation, A. Novikov and co-authors, 2014 [7] allocate the following levels in the system of its management on materials of training of high-class sportsmen:

- the first level displays a target activity of a sportsman in the conditions of competitions which is directed on the achievement of an optimum result. Basic elements of the competitive activity: efficiency and interval of attack actions, "reliability" of protection, variety, technical and tactical actions and others;
- the second level displays the system of models of the competitive activity of the main parties of sports skill: technical, tactical, special physical, psychological and others;
- the third level characterizes functional preparedness of sportsmen which is the necessary prerequisite of effective realization of sports skill in the competitive activity.

The competitive activity in team sports has a difficult multilevel hierarchical structure and has no full analogs in other sports. In researches E. Doroshenko, 2013; 2014 [1; 2] the competitive activity in basketball is considered as a system-created factor which considerably determines the creation of long-term training of highly skilled sportsmen. By the author it is noted that efficiency of the competitive activity in basketball depends on many factors, conducting from which is indicators of technical and tactical skill.

The use of individual approaches is important at a stage of the maximum realization of opportunities in the structure of long-term training of basketball players of high qualification. It concerns features of training taking into account factors of a game role of basketball players, sports experience, a level of the development of special motive abilities, skills, tasks on a concrete game and others. In the monograph of Kozina, 2009 [3] it is noted that the creation of competitive microcycles on the basis of an individualization of training of highly skilled basketball players has a rather high efficiency of technical and tactical actions both in educational training, and in competitive processes. V. Kostyukevich, 2010 [5] notes that it gives the chance of the creation of individual models of the competitive activity of sportsmen of a different game role which are a peculiar reference point at the creation of long-term preparation in general and its concrete stages.

The long-term training of basketball players at different stages of sports improvement, the review of urgent problems and ways of their decision, the experimental check of efficiency of the existing approaches and the principles of its construction are considered in details and fundamental in works of I. Maksimenko, 2009 [6] (on material of young sportsmen) and V. Koryagin, 2010 [4].

Modern approaches to the creation of long-term preparation in basketball need the correction as a result of essential influence of processes of an individualization of training of high-class sportsmen and professionalizing of an elite sport.

These factors create essential difficulties in processes of training of basketball players and practical realization of the available potential in official international competitions both for sportsmen and coaches of teams, and for specialists of complex scientific groups. The available disproportion between a need of simultaneous (or parallel) improvement of individual and team technical and tactical interactions creates essential difficulties at the creation of concrete microcycles of a certain orientation in the structure of long-term preparation. This problem gains especially powerful value at a stage of the maximum realization of individual opportunities of sportsmen in basketball when influence of processes of professionalizing of an elite sport on long-term preparation reaches the maximum values.

Communication of the research with scientific programs, plans, subjects. The research is a part of the research work of the chair of sports of National university of physical training and sport of Ukraine (Kiev) which is carried out according to the Built plan of the research work in the sphere of physical culture and sport for 2011-2015 of the Ministry of affairs of family, youth and sport in Ukraine, by a subject 1.2. "Modern professional sport and ways of its development in Ukraine" No. of the state registration – is 0111U001715.

The objective of the research: to define factors of efficiency of the competitive activity of highly skilled basketball players at a stage of the maximum realization of individual opportunities.

The object of the research – is the competitive activity of highly skilled basketball players at a stage of the maximum realization of individual opportunities.

The subject of the research – are indicators of technical and tactical actions, aged indicators in the course of preparation and the competitive activity of highly skilled basketball players at a stage of the maximum realization of individual opportunities.

Material and methods of the research. Indicators of the competitive activity of basketball players of a national team of Ukraine are analyzed in games of the European championships during 1995-2013. For the solution of tasks of the research the following methods are used: 1) analysis and synthesis of data of scientifically methodical literature and data of Internet; 2) analysis of official protocols of the competitive activity; 3) analysis and synthesis of the best pedagogical practices; 4) pedagogical supervision; 5) methods mathematical statistics.

Results of the research and their discussion. The European basketball championship is an official tournament among the European national teams which passes every two years under the patronage of the International federation of basketball associations (FIBA). The national teams of Yugoslavia, Russia, Italy, Turkey and Spain dominated for years of independence, since 1991 in the European championships. The men's basketball national team of Ukraine participated in six final parts of the European championships. Since 1997, the national team of Ukraine didn't take a place above the 13th. It was succeeded to the change a condition of events in 2013 when the men's national team of Ukraine took the highest the 6th place in the history, and acquired the right to take part in the final part of the World Cup of 2014 in Spain (tab. 1).

Table 1

Results of performances of a national basketball team of Ukraine in final parts of the European championships during 1997-2013, n=6

Taken places	National teams					
	Final tournament 1997	Final tournament 2001	Final tournament 2003	Final tournament 2005	Final tournament 2011	Final tournament 2013
1	Yugoslavia	Yugoslavia	Lithuania	Greece	Spain	France
2	Italy	Turkey	Spain	Germany	France	Lithuania
3	Russia	Spain	Italy	France	Russia	Spain
6	–	–	–	–	–	Ukraine
13	Ukraine	–	–	Ukraine	–	–
14	–	–	Ukraine	–	–	–
16	–	Ukraine	–	–	–	–
17	–	–	–	–	Ukraine	–

Studying of features of the formation of a quantitative line-up by game roles allowed finding certain differences which testify to taste coaches who headed national teams of Ukraine, to different tactical schemes in the course of the competitive activity and according to the structure of preparation of the team for participation in final tournaments of the European championships (tab. 2).

Table 2

Quantitative structure of a national basketball team of Ukraine in final parts of the European championships during 1997-2013, n=6

Role of players	National teams					
	Final tournament 1997	Final tournament 2001	Final tournament 2003	Final tournament 2005	Final tournament 2011	Final tournament 2013
Point guard	4	3	5	4	5	2
Forward	4	5	3	4	4	6
Center	4	4	4	4	3	4

The pedagogical analysis of the competitive activity of a national team of Ukraine testifies that the most effective is the structure of combined Ukraine of a sample of 2013 under the leadership of the famous American expert – Michael Fratello in which the solution of the main game objectives was necessary on players of attack positions: “easy” and “heavy” forwards and center.

The ratio of won and lost games in final tournaments of the European championships to a certain extent allows estimating the level of preparedness of a national team of Ukraine during the studied period. Results of these researches are presented in tab. 3.

Table 3

Indicator of a ratio of “victories-defeats” of a national team of Ukraine of basketball in final parts of the European championships of 1997-2013, n=6

Results of a game	Final tournaments of the European basketball championships					
	1997	2001	2003	2005	2011	2013
Victories	3	2	0	3	2	6
Defeats	2	4	6	6	3	5
Correlation	+1,5	-0,5	0	-0,5	-0,67	+1,2

It is well-known that efficiency of the competitive activity of highly skilled basketball players is estimated also by means of definition of a ratio of points gathered and passed by the team. Similar information allows forming an expert assessment concerning training of players and with rather high degree of reliability to define strong and weaknesses attack and protective actions of the team (tab. 4).

Table 4

Indicator of the gathered and passed points of a national team of Ukraine of basketball in final parts of the European championships of 1997-2013, n=6

Points	Final tournaments of the European basketball championships					
	1997	2001	2003	2005	2011	2013
Gathered	194	214	213	194	322	378
Passed	224	256	249	269	327	352
Difference	-42	-42	-36	-75	-5	+26
Correlation	≈0,87	≈0,84	≈0,86	≈0,72	≈0,98	≈1,07

The data presented in tab. 4 testify that the positive difference and a ratio of the gathered and passed points is a powerful factor of efficiency of the competitive activity. It is one of the main components which allowed a national team of Ukraine to take the sixth place in the European championship on basketball in 2013. And though in the research of indicators of the competitive activity there are no minor factors, after all everyone definitely determines a concrete contribution to the received result, quantitative and qualitative parameters of separate factors and their total contribution to final competitive result can differ considerably depending on specific technical and tactical actions and a concrete competitive situation. The vast majority of experts-specialists and scientists adhere to thought that the highest level of skill of certain basketball players and teams in general, the more significant role especially in the achievement of positive result can play a concrete factor of the competitive activity. The final result of the competitive activity of highly skilled basketball players during final tournaments in decisive games often is defined by minor factors. At the high level of sports qualification and equal indicators of technical and tactical skill overwhelming are individual qualities and “firm” skills of highly skilled sportsmen. In tab. 5 quantitative indices of individual efficiency of the competitive activity of highly skilled basketball players (players of a national team of Ukraine) are given in final tournaments of the European championships of 1997-2013.

Average indicators of individual technical and tactical actions of highly skilled basketball players in final parts of the European championships of 1997-2013 are presented in tab. 6. The pedagogical analysis of average indicators of the competitive activity gives the grounds for the formation of model characteristics. Researchers of this perspective allocate five main directions of the formation of model characteristics of highly skilled sportsmen at stages of long-term preparation:

- by maximum indicators;
- by minimum indicators;
- by average indicators;
- by ranges or intervals of indicators (the minimum – the maximum indicators);
- by the principle of existence of the leading qualities of a player at minimum sufficient indicators of other (minor) qualities. This direction is used when forming models of the strongest sportsmen of a certain game role.

The pedagogical analysis of the indicators presented in tab. 6 allows to claim that quantitative and quality indicators of performance of throws from the game (separately 2, 3-point and penal), picking up in attack and defense, assists, interceptions, block shots and losses of a ball are the most informative and significant in the course of the special analysis of indicators of the competitive activity of highly skilled basketball players. The informational content of the indicators which are taken out for discussion is proved by their use in formation of statistical material by rules of competitions under the auspices of FIBA (The international federation of basketball associations) and FBU (Federation of Basketball of Ukraine). The aged indicators of highly skilled basketball players who as a part of a national team of Ukraine took part in games of

Table 5

Indicators of efficiency of the competitive activity of a national basketball team of Ukraine in final parts of the European championships of 1997-2013, n=6

Indicators of the competitive activity	Final tournaments of the European basketball championships					
	1997	2001	2003	2005	2011	2013
2-point throws, n_1 / n_2	99/193	60/127	60/143	61/135	80/167	183/401
Effectiveness, %	51,3	47,2	42	45,2	47,9	45,6
3-point throws, n_1 / n_2	19/77	14/38	16/51	11/53	33/91	90/258
Effectiveness, %	24,7	36,8	31,4	20,8	36,3	34,9
Free throws, n_1 / n_2	118/167	52/74	45/66	39/62	61/101	139/209
Effectiveness, %	70,7	70,3	68,2	62,9	60,4	66,5
Assists, n_1	38	30	42	30	65	137
Interceptions, n_1	66	22	20	12	26	57
Block shots, n_1	-	4	11	5	15	36
Losses, n_1	122	55	58	71	109	214
Picking up in attack, n_1	32	22	24	42	35	121
Picking up in defense, n_1	65	55	63	64	120	267
Amount of picking ups, n_1	97	77	87	106	155	388

Note. n – a number of final tournaments; n_1 – a total of technical and tactical actions; n_2 – a number of effective technical and tactical actions.

Table 6

Average indicators of the competitive activity of a national team of basketball Ukraine in final parts of the European championships of 1997-2013, n=6

Indicators of the competitive activity	Final tournaments of the European basketball championships					
	1997	2001	2003	2005	2011	2013
2-point throws, n_1 / n_2	19,8/38,6	20,0/42,3	20,0/47,7	20,3/45,0	16,0/33,4	16,6/36,5
3-point throws, n_1 / n_2	3,8/15,4	4,7/12,7	5,3/17,0	3,7/17,7	6,6/18,2	8,2/23,5
Free throws, n_1 / n_2	23,6/33,4	17,3/24,7	15,0/22,0	13,0/20,7	12,6/20,2	12,6/19,0
Assists, n_1	7,6	10,0	14,0	10,0	13,0	12,5
Interceptions, n_1	13,2	7,3	6,7	4,0	5,2	5,2
Block shots, n_1	-	1,3	3,7	1,7	3,0	3,3
Losses, n_1	15,8	18,7	11,0	15,0	16,0	12,6
Picking up in attack, n_1	6,4	9,0	8,0	14,0	7,0	11,0
Picking up in defense, n_1	13,0	18,3	21,0	21,3	24,0	24,3
Amount of picking ups, n_1	19,4	27,3	29,0	35,3	31,0	35,3

Note. n – a number of final tournaments; n_1 – a total of technical and tactical actions; n_2 – a number of effective technical and tactical actions.

final tournaments of the European championships of 1997-2013 are presented in tab. 7.

The analysis of data which are presented in tab. 7, allows claiming, what average age of highly skilled basketball players who participated as a part of a national team of Ukraine in final tournaments of the European championships of 1997-2013, is in range ~24–27 years old. The minimum and maximum aged values make respectively 19 and 34 years old. These indicators can be considered a certain reference point of the aged indicators of basketball players of high qualification who are at a stage of the maximum realization of individual opportunities in the structure of long-term preparation. Complexity of the structure of the competitive activity and long-term preparation in basketball allows noting that reference of a concrete sportsman to a stage of long-term preparation, being guided only by the aged indicators is rather difficult task as a result of influence of a wide range of factors which determine the efficiency and the productivity of the competitive activity.

Conclusions

1. The major factors of efficiency of the competitive activity of highly skilled basketball players at a stage of the maximum realization of individual opportunities are indicators of technical and tactical actions in the competitive process (official games of national superiority, European championships, the world, League of Europe, but other). The most informative and significant in the course of the special analysis of indicators of the competitive activity of highly skilled basketball players are quantitative and quality indicators of performance of throws from a game, picking up in attack and protection, assists, interceptions, block shots and losses of a ball.

2. The approximate aged indicators of highly skilled basketball players of a stage of the maximum realization of individual opportunities in the structure of long-term preparation by the results of our research can be considered the

Table 7

The aged indicators of basketball players of a national team of Ukraine in final parts of the European championships of 1997-2013, n=6

Number of a player on official protocol	The aged indicators of basketball players in final parts of the European championships, years					
	1997	2001	2003	2005	2011	2013
№ 4	28	22	24	26	24	26
№ 5	23	32	27	24	22	30
№ 6	27	22	24	26	27	21
№ 7	26	22	23	26	23	25
№ 8	23	27	28	27	20	25
№ 9	24	19	24	26	27	22
№ 10	28	22	32	29	34	23
№ 11	24	30	29	27	26	29
№ 12	26	25	30	23	29	26
№ 13	28	24	28	20	29	24
№ 14	32	25	27	30	25	21
№ 15	27	24	25	26	24	26
\bar{X}	26,33	24,50	26,75	25,83	25,83	24,83
S	2,61	3,68	2,80	2,62	3,74	2,86

following: average indicators – about 24-27 years old; aged ranges – 19–34 years old.

Prospects of the subsequent investigations in this direction is based on the specification of indicators of efficiency of the competitive activity in the aspect of sexual dimorphism on materials of official games of the women's national team of Ukraine in the European championships and the specification of the aged indicators of highly skilled basketball players at a stage of the maximum realization of individual opportunities.

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Improving the training process of highly skilled bodybuilders in the preparatory period, general preparatory phase

Abstract. Purpose: to improve the method of training highly skilled bodybuilders during the general preparatory phase. **Material and Methods:** the study involved eight highly skilled athletes, members of the team of Ukraine on bodybuilding. **Results:** comparative characteristics of the most commonly used methods of training process in bodybuilding. Developed and substantiated the optimal method of training highly skilled bodybuilders during the general preparatory phase of the preparatory period, which can increase body weight through muscle athletes component. **Conclusions:** based on studies, recommended the optimum method of training highly skilled bodybuilders depending on mezotsykles and microcycles general preparatory phase.

Keywords: general preparatory stage training process, qualified bodybuilder, muscular component, the optimum method.

Introduction. Bodybuilding – is a rather young sport which quickly develops. The main researches were always aimed at providing requirements of “classical” sport a basis of which is more training of qualities of sportsmen, and an accumulation of muscular weight was considered as an addition to the development of these qualities [1; 2]. Therefore still there is no evidence-based technique of training for a set of muscular weight, coaches and sportsmen should look for an optimum technique by trials and errors [6].

The analysis of native and foreign special literature showed that many works are devoted to training programs of management of a muscular component of a body weight (V. M. Platonov, M. M. Bulatova; V. G. Oleshko; V. V. Usichenko, V. Yu. Jim, A. V. Samsonova, Joe and Ben Weiders, Mike and Ray Mentsers, Artur Jones but other [1–10]).

For today the scientific concept of long-term training of sportsmen is created: from beginners to masters of sports of international class – as the only process which submits to certain regularities of a difficult specific system of training with inherent to it features and ways of a development (V. M. Platonov; L. P. Matveyev; V. V. Mulik) [1; 12; 13].

An accumulation of muscular volumes by an application of general exercises which are carried out at slow speed with a big encumbrance and rather small amount of repetitions in attempt is a main objective of the preparatory period lasting 8 months at a one-cycle planning of an annual preparation. A necessary condition of rational preparation at bodybuilding is a renewal of operability of muscular groups between training classes. Therefore exercises are used in one class which promotes the development of two – three muscular groups. It is revealed that it is enough two intensive classes for a week for one group of muscles for the maximum adaptive reaction. The increase in quantity of loading can become an excess stress for muscular and nervous systems because it is necessary not less than 48 hours for a recovery reaction after the implementation of intense programs [1].

At a selection of exercises for classes in the preparatory period it is necessary to be guided by general exercises which put into work large muscular volumes. Exercises have to be different and provide a harmonious development of all parts of a body, and resistance – is rather big, rate of performance – slow, number of repetitions in each exercise is rather small. Pauses between approaches are rather big – two minutes that provides a renewal of the working capacity.

When planning the program it is necessary to use widely methodical techniques which increase the efficiency of exercises concerning a set of muscular weight.

The amount of encumbrance – is 70–90% of the most available. The number of repetitions fluctuates in the range from 4 to 12. The range of 6-8 repetitions is most often used [1; 2].

The general-preparatory stage of the preparatory period (duration of 20 weeks) includes two drawing and three basic mesocycles in preparation of qualified bodybuilders in two-cycle planning. The basic mesocycle provides a creation of conditions for the subsequent hard work connected directly with accumulation of muscular volumes and improvement of a relief of muscles [7].

Communication of the research with scientific programs, plans, subjects. The scientific research is executed by a subject of the Built plan of the research work in the sphere of physical culture and sport for 2011-2015 by a subject 3.7 “Methodological and organizationally methodical bases of definition of an individual norm of a physical condition of a person” (number of the state registration is 0111U000192).

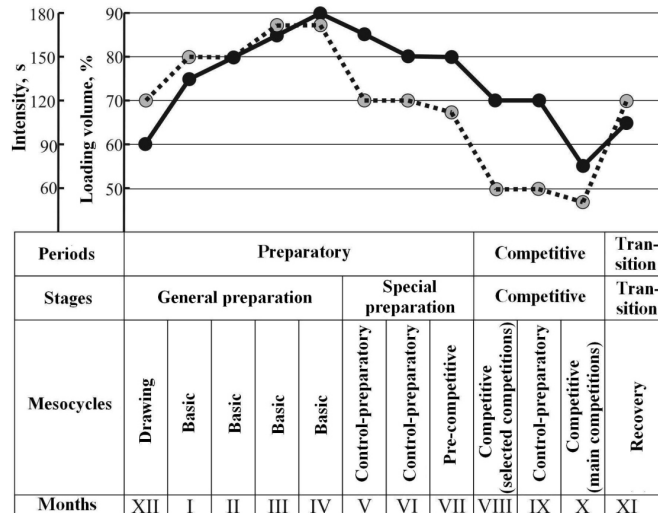
The objective of the research: the improvement of a technique of training of highly skilled bodybuilders in the general-preparatory stage.

Materials and methods of the research. Research methods: theoretical method and generalization of literature, pedagogical supervision, pedagogical experiment, method of mathematical statistics. **Materials of the researches:** 8 highly skilled bodybuilders took part in this research – members of a national team of Ukraine.

Among them are 6 masters of sports and two masters of sports of international class of Ukraine. The age of sportsmen is 25-31 years old. The body weight of sportsmen makes: 85 ± 2 – 105 ± 2 kg. Participants were distributed on two groups – control and experimental on four sportsmen of identical sports qualification in everyone (1 MSIC and 3 MSU). Participants of the experiment trained 4–5 times for a week.

Results of the research and their discussion. The feature of the training process of highly skilled bodybuilders is caused by that the one-cycle system of a planning in an annual macrocycle (pic. 1) was applied to preparation of bodybuilders of high-class. Thus, a training technique was developed in the preparatory period of the general-preparatory stage with an application of two options of training techniques which differed in loading and volume of training exercises,

rest and intensity. The assessment is carried out by means of diaries of training in which a quantity and volumes of a training work were specified.



Pic. 1. Scheme of the one-cycle planning of an annual preparation of highly skilled bodybuilders: — loading volume, intensity of loading

The efficiency of preparation was estimated by means of a method of expert evaluations which provided an application of information concerning the implementation of instructions of a coach, by the dynamics of power and endurance indicators, dynamics of anthropometrical changes, pulse and arterial pressure were measured that allows defining a functional condition of an organism.

Sportsmen of the control group during the experiment had two drawing mesocycles and three basic. Drawing mesocycles consisted of four microcycles everyone, two of which were extending, and two recoveries. Basic mesocycles consisted of one drawing, impact and recovery microcycles (tab. 1).

Sportsmen of the experimental group had one drawing and four basic mesocycles. The drawing mesocycle had three drawing and one impact microcycles. Basic mesocycles had the following scheme: impact microcycle – recovery – drawing – impact (tab. 2)

Sportsmen of the experimental group during the basic mesocycle had three drawing microcycles that promotes a gradual preparation for impact loadings. As the general -preparatory stage in the scheme of one-cycle preparation after the competitive period, during the transition period sportsmen increase the caloric content of a diet and the amount of carbohydrates, it is necessary to increase gradually encumbrances as the sharp increase in loading can lead to a trauma.

For the development of muscular volumes we investigated in scientific literature factors in a percentage ratio which influence the volume of muscular fibers:

- Capillarization – 3–5%.
- Sarcoplasm – 20–30%.
- Myofibrils – 20–30%.
- Mitochondrions – 15–25%.
- Connecting tissue - 2-3%.
- Glycogen - 2-5%.

The periodization of the basic mesocycle was constructed so that to increase muscular volume at the expense of myofibrils and sarcoplasm hypertrophy.

Mechanical damages of muscular fibers and connecting tissue are the main reason for pain in muscles. They appear in 8–12 hours, reach a maximum in 24–72 hours, and pass in 5–12 days depending on the extent of damages and speed of renewal of sportsmen [7; 14].

J. Neumann with coauthors (in 1984) showed that 16% of fibers had a small damage, 16% – strong, 8% – very strong after a highly intensive training. After eccentric exercises the amount of the damaged fibers was made by 52% in three

Table 1
Scheme of the general -preparatory stage of the control group

Stage	Mesocycle	Microcycle
General -preparatory	Drawing	Dr Dr Dr Re
	Drawing	Dr Dr Dr Re
	Basic	Dr Im Im Re
	Basic	Im Re Im Im
	Basic	Re Im Im Im

Note. Microcycles: Dr – drawing, Im – impact, Re – recovery.

Table 2
Scheme of the general -preparatory stage of the experimental group

Stage	Mesocycle	Microcycle
General -preparatory	Drawing	Dr Dr Dr Im
	Basic	Re Dr Im Re
	Basic	Dr Im Re Dr
	Basic	Im Re Dr Im
	Basic	Re Dr Im Re

Note. Microcycles: Dr – drawing, Im – impact, Re – recovery.

days. Damages of muscular fibers and myofibrils cause the regeneration of muscular fabric [7]. The phase of super-compensation comes after the renewal of muscular fibers when organism increases the volume of albuminous structures of muscles.

The process of renewal of muscles proceeds heterochromatically. So, the phase of super-compensation of keratin-phosphate is reached in a few minutes rest after loading which leads to essential decrease in its level. The achievement of the expressed super-compensation of the maintenance of glycogen in muscles requires not less than 2-3 days, by this moment the level of keratin-phosphate will already enter a phase of the lost super-compensation. The bigger period of time will be required, about 12-14 days during which the glycogen level in muscles can already return to day off for renewal of structures of the cages destroyed during trainings [11].

The training process of bodybuilders of the experimental group was based so that the structure of cages and the level of a glycogen were in the phase super-compensation during the impact microcycle. These objectives were achieved the next way: sportsmen worked in a zone of the maximum and submaximum power in the impact microcycle, characteristics of this operating mode is a destruction of myofibrils, accumulation of products of disintegration, and a big tension of functioning of many systems of an organism in the operating time. The work is performed on the verge of operability of CNS and the motive device; at the most available speed of training on indicators of respiratory and cardiovascular systems. The work proceeds in the conditions of considerable shifts in the internal environment of an organism decrease of pH blood. The work proceeds in the conditions of relatives to anaerobic. The concentration of lactic acid grows in 15-20 times and reaches 200–280 mg on 100 ml of blood. During the impact microcycle sportsmen of the experimental group used the eccentric method of performance of exercises on the lagging behind muscular groups that promoted a bigger destruction of myofibrils and more expressed subsequent super-compensation. During the recovery microcycle intensity decreased and training volume increased, a task of this microcycle was not in defiance of a structural component of muscles to reduce quantity of glycogen in muscles for the subsequent super-compensation in the impact microcycle. Sportsmen of the experimental group used the method “pamping” for the solution of this task.

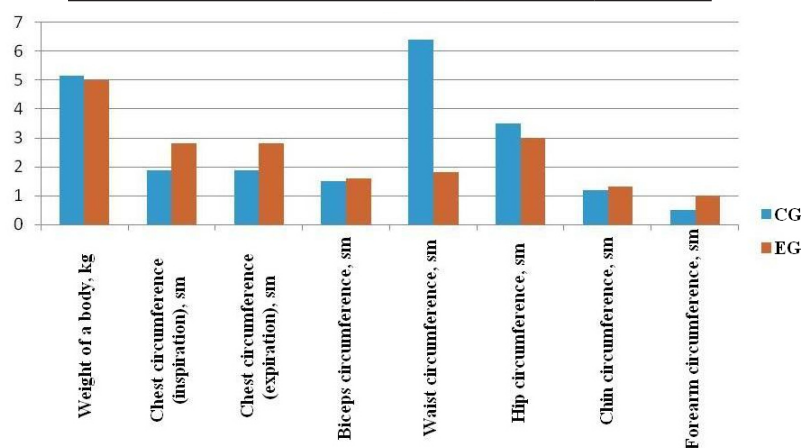
«Pamping» – is a training technique which purpose of application is the increase of a rush of blood to working muscles, and also obstacles to blood outflow from them. An indispensable condition of «pamping» training is the high number of repetitions in one attempt and a large number of attempts on group of muscles. Blood which is «injected» in muscles, stretches fascias, does them by more elastic that in turn promotes the creation of new space for growth of fibers. Strengthening of a blood-groove in muscles promotes the increase in delivery of nutrients, vitamins, and hormones that promotes faster renewal of muscles. Sportsmen trained during this microcycle in the range from 15 to 25 repetitions in an approach, rest made 30–45 seconds. Encumbrance is 30-50% from the maximum.

During the drawing mesocycle the bodybuilders worked by a standard technique, four exercises for big muscular groups, three for the small. In each exercise there are 3-4 attempts on 8-12 repetitions, rest is 1,5-2 minutes between attempts.

Table 3

Indicator of a gain of anthropometrical data of highly skilled bodybuilders throughout the general-preparatory stage

Indicators	CG	EG
Weight of a body, kg	5,17±0,25	4,99±0,2
Chest circumference (inspiration), sm	1,87±0,2	2,8±0,16
Chest circumference (expiration), sm	1,87±0,2	2,8±0,16
Biceps circumference, sm	1,5±0,07	1,6±0,08
Waist circumference, sm	6,4±0,2	1,8±0,2
Hip circumference, sm	3,5±0,17	3,0±0,12
Chin circumference, sm	1,2±0,1	1,3±0,1
Forearm circumference, sm	0,5±0,1	1±0,1



Pic. 2. The comparative diagram of a gain of anthropometrical data of highly skilled bodybuilders of the control and experimental groups at the end of the preparatory period of the basic stage

The Harvard steppe-test was used for an assessment of a functional condition of sportsmen. Sportsmen of both groups within 5 minutes rose by the steppe-platform 50 sm high. The rate of performance of the exercise – is 30 rises and descents for a minute. After the performance of the exercise pulse is measured for 30 s, pulse is measured on the 2nd, 3rd, 4th minutes of updating.

Index of HST= $t \times 100 / (f_1 + f_2 + f_3)$, where f_1 ; f_2 ; f_3 – is data of measurement of pulse on the 2nd, 3rd, 4th minutes of rest, and t – is the time of implementation of the test.

Table 4
Result of Harvard steppe-test

Participants of the experiment	Category	t, time in seconds	f1	f2	f3	IHST
Control group						
1	MSIC	300	83	77	72	64,65517
2	MS	300	80	75	68	67,26457
3	MS	300	82	75	70	66,0793
4	MS	300	80	73	69	67,89163
Experimental group						
1	MSIC	300	62	54	51	89,82036
2	MS	300	70	65	60	76,92308
3	MS	300	80	70	65	69,76744
4	MS	300	72	70	65	72,46377

Note. Indicators of Harvard steppe-test: <55 – is bad physical fitness, 55–64 – below an average, 65–79 the average level, 80–89 – the average level, >90 – excellent preparation.

At the end of the general-preparatory stage of the preparatory period at sportsmen of the control group the gain on 5,17 kg of body weight, increases in the volume of biceps, on 1,5 sm, hips – on 3,5 sm, breasts – on 1,87 sm, shins – on 1,2 sm, a forearm – on 0,5 sm was observed, the volume of a waist increased by 6,4 sm. Sportsmen of the experimental group increased body weight by 4,99 kg, biceps volume – by 1,6 sm, breasts – by 2,8 sm, hips – by 3 sm, shins – by 1,3 sm, a forearm – by 1 sm, the circle of a waist increased by 1,8 sm. By the results of Harvard steppe-test, sportsmen of the experimental group renewed quicker and had the best functional state.

Conclusions. Thus, the conducted research concerning the improvement of the training process of highly skilled bodybuilders allowed establishing that the effect was more expressed and the level of preparedness can be estimated as the most optimum in the EG. The offered technique of the improvement of the training process significantly reduces probability of the formation of adverse shifts of a functional condition of sportsmen (overstrains, overtraining, injuries), allows to reach the necessary level of sportswear without overstrain of adaptation and compensatory mechanisms. This technique allows bodybuilders of high qualification to gain muscular weight and to improve proportions. The body weight of sportsmen increased at the expense of muscular hypertrophy, but not at the expense of fatty layers. The advanced technique of training for highly skilled bodybuilders at the general-preparatory stage of the preparatory period can be recommended for preparation of bodybuilders for the observance of requirements of sports and medical control.

The subsequent researches have to contain the development and foundation of the training process of highly skilled bodybuilders in the specially-preparatory stage of the preparatory period of preparation.

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The training program in basic gymnastics jumps at the stage of initial training

Abstract. Purpose: improving of the technical training of girls that are engaged in rhythmic gymnastics at the stage of initial training.

Materials and Methods: for the development of a training program for jumping in athletes who are engaged in rhythmic gymnastics at the stage of initial training conducted analysis of scientific literature. **Results:** it was determined that the absorption of the rhythmic structure of elements greatly accelerates and facilitates the process of studying in a cyclic (athletics) and acyclic sports (judo, wrestling). This is a prerequisite for the development of the training program of the jumps through assimilation rates their performance. These various methods of influence are indicated on the development of sense of rhythmic gymnasts at the stage of initial preparation and learning the rhythmic structure of the basic jumps. **Conclusions:** the program of teaching basic jumping for gymnasts at the stage of initial training, a variety of methods of influence on the development of sense of rhythm and learning the rhythmic structure of the elements was developed. The project of the training session for the development of a sense of rhythm and learning the rhythmic structure of the basic jumps was developed.

Keywords: jumps, basic, gymnastics, rhythmic, initial training.

Introduction. The essential growth of intensity of a competitive fight in modern rhythmic gymnastics sharply puts a problem of the improvement of training of young gymnasts. Its decision needs the development of new effective approaches to training of gymnasts, since the initial stage of long-term preparation [6].

The optimum organization of the educational-training process at the stage of initial sports specialization are an important condition of ensuring growth of results in a long-term competitive practice. At this stage it is preferred as versatile physical preparation at rather small volume of special exercises [1; 11; 13; 14; 17].

Experts pay special attention to technical training of sportswomen in the training process [1; 4; 7; 12]. The ability to carry out accurately difficult coordination movements allows gymnasts to reach high sports results, and as a result considerably increases reliability of realization of technical actions during a performance of exercises [5].

There is a problem of study of jumps, in particular, as experts testify (O. E. Aftimchuk), running start and attack for a performance of jumps at the stage of initial preparation in rhythmic gymnastics [2].

Each motive element has the accurate rhythmical structure which can be created in the conditions of purposeful education of feeling of a rhythm through perception of a musical rhythm, use of soundleaders, performance of special exercises in the training process [2; 9]. The process of perception of a musical rhythm is carried out as a result of the rhythmical nature of neuromuscular processes which happen in a human body [11; 12].

Psychology-pedagogical and physiologic bases of study in rhythmic gymnastics essentially don't differ from standard in sports practice, but have some specific features that are connected first of all with features of the creation of specialized movement skills and managements of them [8; 10; 13]. The formation of so-called "expressive skill" of possession of own body is one of such features. The special value in this regard gets music as an important factor of influence on a gymnast in the course of study. Experts emphasize that when forming idea of the studied action, its expressive and kinestetic images, that is already at the first stage of a study, it is necessary to prefer as a figurative description of exercise with application of an analytical approach. The prevalence of only rational approach at an explanation and a display to understanding of movements by a gymnast leads to a considerable complication of the development of many elements [8; 10; 13].

The organization of a perception is necessary for an effective assimilation of a training material, in other case it is carried out spontaneously and each gymnast perceives first of all that she is interested in personally, and has for her some value. The spontaneous perception of physical exercises in the best case leads to blind inheritance. Important details which should be apprehended and studied first of all, remain unaddressed. The development of a perception is of great importance for successful training activity of young gymnasts at study of technique [1; 4; 14].

The process of technical training provides two main components in gymnastics: a stage of formation of technical skill and a stage of its improvement [16]. According to a concept of N. G. Suchilin, a sportsman masters in perspective of technique of elements of different complexity in the course of the stage of formation of technical skill – basic and main elements [16]. Their studying depends on quality progress of a study of gymnasts at the stage of the improvement of technical skill.

A display of exercise by a trainer is widely used in rhythmic gymnastics at the stage of the previous learning of exercises. Before a display such requirements belong: accuracy, orientation on the solution of tasks, compliance to this stage of the development of exercise. Offering a figurative explanation, a trainer demands the necessary expressiveness of each movement, but at the same time specifies also necessary elements of technique [14; 16]. It is possible to refer to such specifications also assimilation of a rational rhythm of performance of jumps which can facilitate and considerably accelerate the process of assimilation of technique of basic jumps.

It also is a prerequisite for the development of the program of study of basic jumps for sportswomen who do rhythmic gymnastics at the stage of initial preparation.

Communication of the research with scientific programs, plans, subjects. The research is executed according to a subject 2.7 "Improvements of the system of physical training of sportsmen taking into account individual and technical profiles of their preparedness", the Built plan of the research work in the sphere of physical culture and sport for 2011-2015.

The objective of the research: to develop the program of study of basic jumps taking into account the rhythmical

structure for sportswomen who do rhythmic gymnastics at the stage of initial preparation.

The tasks of the research:

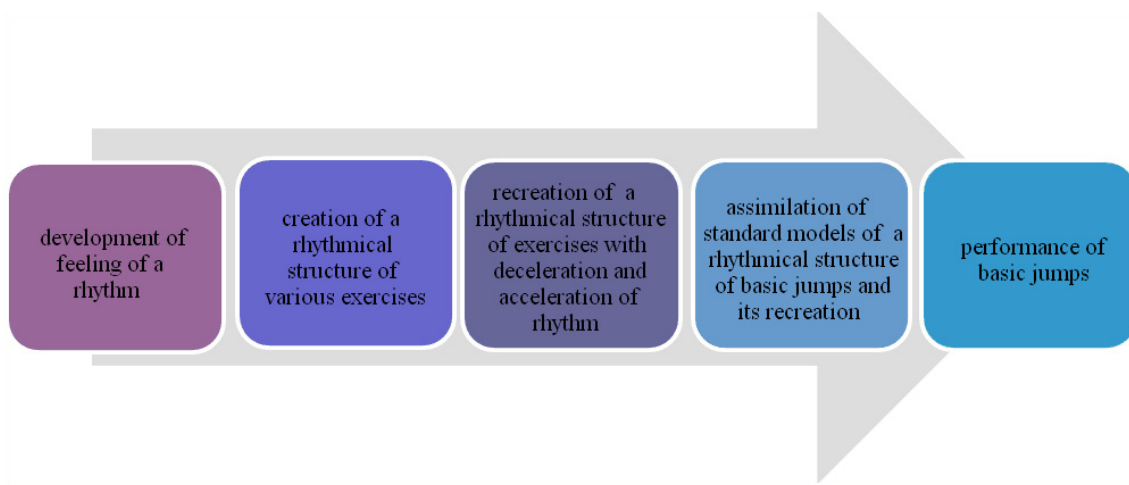
1. To analyse the existing programs of preparation for gymnasts of the stage of initial preparation.
2. To define sequence and features of studying of different groups of jumps.
3. To develop the program of study of jumps for sportswomen who do rhythmic gymnastics at the stage of initial preparation.

Material and methods of the research. We used the following methods of the research for the decision the above-put tasks: analysis of scientific literature and normative documents, questioning, pedagogical supervision, video analysis.

Results of the research and their discussion. As a result of the analysis of scientifically methodical literature it was found out that to start work with gymnasts at the stage of initial preparation it is necessary to create imagination about a rhythmical structure of exercise which is studied. For this purpose it is necessary to develop of feeling of a rhythm at gymnasts who are the first task in the developed program.

Video filming of their performance at gymnasts was carried out for the definition of the rhythmical structure of a performance of jumps at the stage of preparation for the maximum realization of opportunities and for the definition of accents when performing jumps by means of the program of "Rhythmics". On the basis of the obtained data models of the rhythmical structure of a performance of basic jumps were developed for gymnasts of 5-8 years old, and also sound leaders on their basis for the use on trainings.

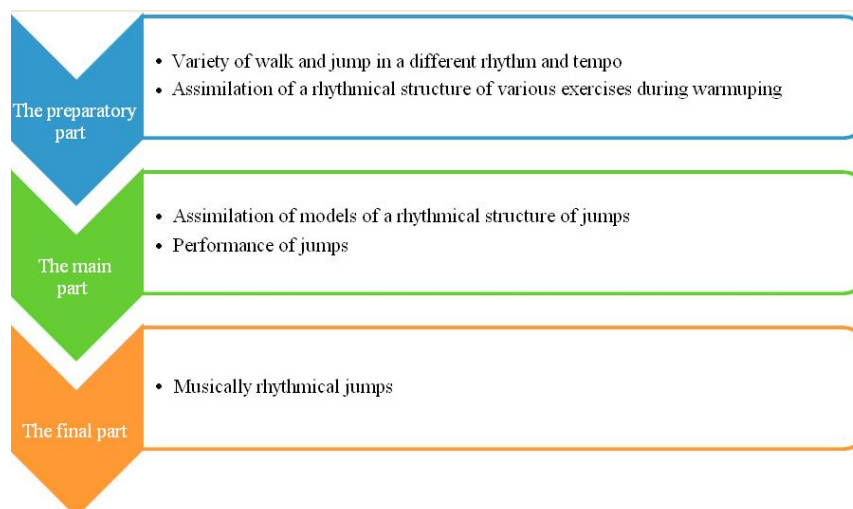
The main contents of the program consist of sets of exercises of the directed influence, use of sound leaders and music.



Pic. 1. The structural model of the program of study of basic jumps at gymnasts at the stage of initial preparation

As experts testify, providing a positive emotional background on classes and their construction in the form of a game, a usage till 60% in general of preparatory exercises that has a display in the program, has an important meaning at the stage of initial preparation [1; 4; 8; 15; 17].

Considering recommendations of specialists in sports training, the project of training class which has the following appearance is developed:



Pic. 2. The project of training class in the program of improvement of a rhythm of a performance of jumps at gymnasts at the stage of initial preparation

In the preparatory part of classes it is necessary to use the following methodical tricks:

- inclusion of gradually complicated tasks which demand an observance of the set parameters of physical actions;
- use of "adjacent tasks" which include a performance of the additional tasks directed on the activation of attention (run with spontaneous correction of a movement in the form of accents (e.g., run, jump on a 3-m step, etc.);
- performance of exercises in the complicated conditions (overcoming of a low hurdle by a right, left foot).

In the main part of classes the use of the following tricks is planned:

- previous rhythmical drawing of a jump before its performance;
- supplying exercises – an assimilation of the main poses of a performance of a jump and their performance at slow speed for the correct assimilation;
- uses of different sound signals (scaling, knock) which prompt the moments of a performance of separate parts of a jump, allocations of accents in rhythmical drawing of physical action in general.
- more difficult tricks in which influences on different analyzers are combined: calculation "about itself";
- acoustical and visual reference points (in the analysis of technique of an execution of jumps by gymnasts which best of all carry out jumps, comparison with others but other).

The scheme of a study of jumps according to the developed program is the following:

1. The development of feeling of a rhythm, the reconstruction of various rhythmical structures.
2. The assimilation of a rhythmical structure of each separate jump.
3. The reconstruction of a rhythmical structure in different ways: aloud, steps, small jumps, applause.
4. The assimilation of the main limit poses of a performance of jumps and transitions between them.
5. The performance of jumps.

Conclusion. As a result of the analysis of scientifically methodical literature and data of questioning of trainers of rhythmic gymnastics we developed the program of study of jumps taking into account a rhythmical structure for gymnasts of 5-8 years old, the efficiency which is planned to check during training classes of the experimental group.

Prospects of the subsequent researches. It is planned to check the efficiency of the developed program in the course of gymnasts and to compare indicators of quality of technical training at the control and the experimental groups.

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Technique-tactical preparedness of the team «Gelios» (Kharkov) by the results of the 24th Ukrainian football championship in the first league (2014–2015)

Abstract. Purpose: to define model characteristics of technique-tactical preparedness of the Ukrainian First League football championship with the aim of further improvement and correction of the training process. **Material and Methods:** the research was conducted using the method of expert evaluation. **Results:** average meanings of the registered values for 13 games were determined. Different technique-tactical actions and their percentage proportions in the total structure of the team game, statistics for 30 games as well as separate indices of the team play of «Gelios» Kharkov were analyzed. **Conclusions:** quantitative and qualitative indices (coefficient of defect) both for team technique-tactical actions and separately for each technique-tactical action.

Keywords: technique-tactical actions, total number of actions, defect coefficient, percentage proportion of the different technique-tactical actions in the total structure of the team game.

Introduction. The priority of domestic experts in the creation of model characteristics of the competitive activity doesn't raise doubts in football [3; 4; 8; 9]. Presently during the development of quantitative indices, what characteristic for the set level of sports skill, it is possible to allocate different approaches [5; 6]. We used the approach which is connected with studying of the considerable set of sportsmen of different qualification, dependence establishment between the level of sports skill and the dynamics of changes of this or that indicator.

Characteristic features of technical skill of the strongest football players is: an ability to carry out any pass at a restriction of time and space exactly and timely, a high precision of kicks on a goal, an excellent game by a head, a high precision of a reception of a ball with any part of a body in difficult situations at a high speed and with obligatory advance, a possession of a wide arsenal of means of enclosing a rival, selections and interceptions of a ball [1; 2; 7].

Thus, an obvious need of the subsequent studying of a problem of features of technical and tactical preparedness of the qualified football players.

Communication of the research with scientific programs, plans, subjects. The research is executed according to the Built plan of the RW in the sphere of physical culture and sport for 2011-2015 by MES of Ukraine by a subject 2.3 "Scientifically-methodical bases of improvement of the system of training of sportsmen in football taking into account features of the competitive activity", and also according to the initiative subject of the RW of the chair of football and hockey of Kharkov state academy of physical culture for 2011-2015 "Optimization of the educational-training process of football players of different qualification".

The objective of the research: to define model characteristics and their changes in team technical and tactical preparedness of a team what took part in the championship of Ukraine of the first league for the subsequent improvement and correction of the educational-training process.

Material and methods of the research. The researches were conducted by means of a method of an expert estimation. 5 experts of football were involved as specialists. Among them: one is the master of sports in football, one – the candidate of the master of sports, others were players of professional teams of football. All experts worked with professional and amateur teams of football as coaches in the past. Among experts: one professor; one candidate of pedagogical sciences, an associate professor; two candidates of science on physical education, an associate professors of football and hockey; one graduate student of the chair of football and hockey of Kharkov state academy of physical culture. If during a registration of the competitive activity of the team "Helios" of Kharkov the debatable questions appeared, they were solved by a majority vote. During the pedagogical supervision the technique assumed a mutual control of indicators of the competitive activity that allowed obtaining more objective data. So, one of the experts counted total of passes, and another talked on a dictophone at the same time, what specifically players (N^o of players.) and which pass was executed by a direction and a distance.

The team "Helios" of Kharkov played 30 matches in the championship of Ukraine for 2014/2015 in the first league. The scientifically-methodical group registered only 13 home matches, from them 7 – the first circle and 6 games of the second circle. The 44th points were gathered and the team took the 7th place from 16 teams. The team "Helios" of Kharkov received 12 victories, 8 draws, 10 defeats. The team "Helios" of Kharkov scored 30 goals and passed 25.

Results of the research and their discussion. Indicators of the technical and tactical activity of the team "Helios" of Kharkov and 13 home games in the 24th football championship of Ukraine are presented in table 1.

The percentage ratio of different technical and tactical actions in the general structure of a play of the team is presented in pic. 1. The greatest contribution to the general structure of a play of the team "Helios" of Kharkov was made by short and average passes forward – 28,6%, short and average passes forward and back – 16,9%, reception of a ball – 14,4%. Actions which define the end result of a game, – kicks on a goal by a foot and by a head – make respectively – 0,9% and 0,5%.

The comparative analysis of positive and negative indicators (tab. 2) and the coefficient of defect (tab. 3) of a performance of technical and tactical actions of the team "Helios" for 23 and 24 football championships of Ukraine were carried out.

So, ($p < 0,01$) a number of negative receptions of a ball (stops) increased in comparison with the previous 23rd championship. Considerably ($p < 0,001$) a number of negative long passes forward increased. The quantity of positive ($p < 0,01$) and negative ($p < 0,05$) interceptions of a ball at the rival decreased. The team players of the "Helios" made fewer ($p < 0,05$) mistakes at a throw-in of a ball from behind a sideline.

Table 1

Indicators of technical and tactical preparedness of the team “Helios” of Kharkov at the 24th football championship of Ukraine in the first league (for 13 games)

Nº	Technique-tactical actions	Quantity of positive on average for a game, $\bar{X} \pm m$	Quantity of negative on average for a game, $\bar{X} \pm m$	Coefficient of defect (%), $\bar{X} \pm m$	Percent of a usage, %
1.	Reception of a ball	89,53±13,37	17,61±1,67	19,6±2,11	14,4
2.	Short and average passes forward	135,92±9,53	76,38±2,14	36,83±1,92	28,6
3.	Short and average passes back and across	110,53±11,48	15±1,18	13,78±2,09	16,9
4.	Long passes forward	22,15±2,12	44,38±3,05	68±1,86	8,9
5.	Long passes back and across	4,18±1,0	5,72±0,81	59,96±4,6	1,3
6.	Single combats at the top	34,38±2,61	28,61±3,15	44,71±3,27	8,4
7.	Enclosing of a rival	17,69±2,09	15,0±1,88	45,27±2,56	4,4
8.	Interceptions of a ball	17,69±1,1	7,07±0,76	28,45±2,61	3,3
9.	Selections of a ball	21,46±1,78	28,76±1,94	57,36±1,67	6,7
10.	Kicks on a goal by a foot	3,84±0,4	3,3±0,51	45,11±4,95	0,9
11.	Kicks on a goal by a head	2,0±0,51	1,87±0,51	40,14±10,52	0,5
12.	Penalty kicks for the 11th	1,0	1	50	0,2
13.	Penalty kicks in an attack zone	2,25±0,25	2,25±0,35	67,2±8,85	0,6
14.	Corner kicks	2,5±0,37	4,08±0,65	62,9±6,63	0,8
15.	Throw-in of a ball from behind a sideline	26,92±2,37	3,54±0,77	9,9±2,18	4,1
16.	Positive and negative TTA	490,76±25,8	251,07±5,59	34,34±1,53	–
17.	In total	741,84±24,46		34,34±1,53	100
18.	Effectiveness ratio	65,63±1,52		34,36±1,52	–

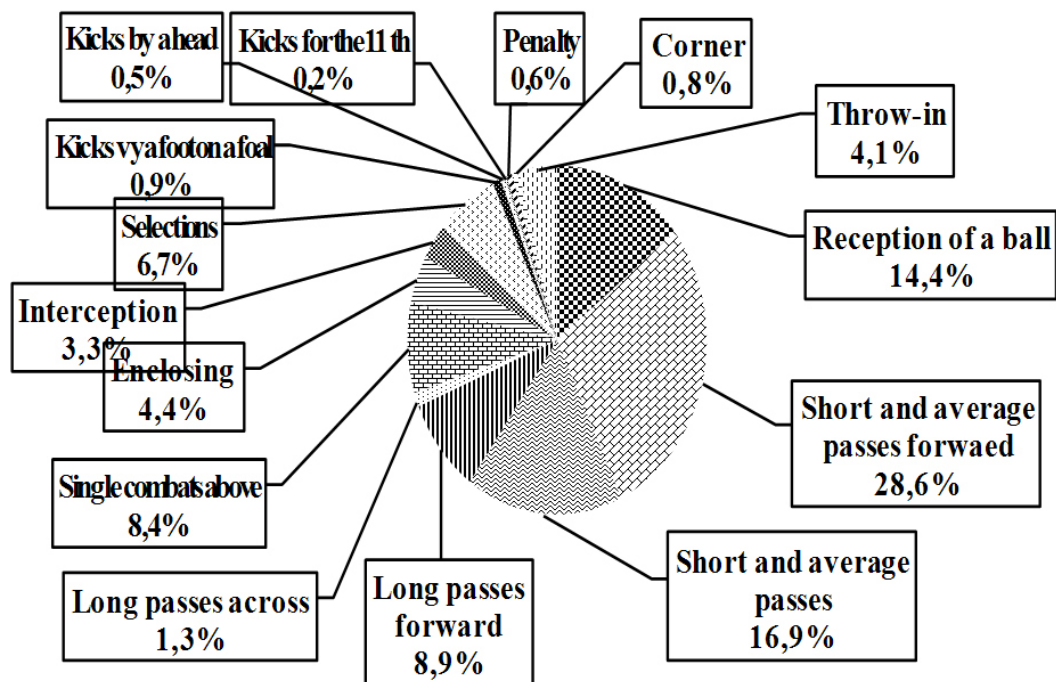


Fig. 1. A percentage ratio of different technical and tactical actions in the general structure of a play of the team “Helios” of Kharkov in the 24th football championship of Ukraine in the first league, %

Table 2

Indicators of the technical and tactical activity of the team "Helios" of Kharkov for 23 and 24th football championships of Ukraine in the first league (on average for a game), $\bar{X} \pm m$

№	Technique-tactical actions	23 championship (n=10)	24 championship (n=13)	p	23 championship (n=10)	24 championship (n=13)	p
		Quantity of positive			Quantity of negative		
1.	Reception of a ball	77,1±3,37	89,53±13,37	>0,05	19,4±1,46	17,61±1,67	>0,05
2.	Short and average passes forward	156,4±16,23	135,92±9,53	>0,05	64,4±2,43	76,38±2,14	<0,01
3.	Short and average passes back and across	132,8±11,21	110,53±11,48	>0,05	17,2±1,7	15±1,18	>0,05
4.	Long passes forward	17,2±1,7	22,15±2,12	>0,05	20,6±1,55	44,38±3,05	<0,001
5.	Long passes back and across	4,0±0,95	4,18±1,0	>0,05	6,4±0,74	5,72±0,81	>0,05
6.	Single combats at the top	33,7±1,52	34,38±2,61	>0,05	23,8±1,5	28,61±3,15	>0,05
7.	Enclosing of a rival	16,2±2,3	17,69±2,09	>0,05	12,7±1,8	15,0±1,88	>0,05
8.	Interception of a ball	26,2±2,24	17,69±1,1	<0,01	10,7±1,28	7,07±0,76	<0,05
9.	Selections of a ball	26,7±2,3	21,46±1,78	>0,05	27,8±1,54	28,76±1,94	>0,05
10.	Shoots for goal foot	3,1±0,45	3,84±0,4	>0,05	4,8±0,62	3,3±0,51	>0,05
11.	Kicks on a goal by a head	1,22±0,36	2,0±0,51	>0,05	2,0±0,5	1,87±0,51	>0,05
12.	Penalty kicks for the 11th	-	1,0	-	1,5±0,5	1	-
13.	Penalty kicks in an attack zone	1,75±0,36	2,25±0,25	>0,05	2,28±0,35	2,25±0,35	>0,05
14.	Corner kicks	3±0,61	2,5±0,37	>0,05	3,8±0,75	4,08±0,65	>0,05
15.	Throw-in of a ball from behind a sideline	23,2±2,01	26,92±2,37	>0,05	5,7±0,53	3,54±0,77	<0,05
16.	Positive and negative TTA	525±24,26	490,76±25,8	>0,05	244,9±6,07	251,07±5,59	>0,05

Table 3

Comparative indicators of the coefficient of defect of a performance of technical and tactical actions of the team "Helios" of Kharkov for 23 and 24th football championships of Ukraine in the first league, $\bar{X} \pm m$

№	Technique-tactical actions	Coefficient of wedlock (%) for 23 championship (n=10)	Coefficient of wedlock (%) for 24 championship (n=13)	p
1.	Reception of a ball	20,2±1,5	19,6±2,11	>0,05
2.	Short and average passes forward	30,67±2,69	36,83±1,92	>0,05
3.	Short and average passes back and across	12,48±1,94	13,78±2,09	>0,05
4.	Long passes forward	68,5±1,75	68±1,86	>0,05
5.	Long passes back and across	64,16±4,61	59,96±4,6	>0,05
6.	Single combats at the top	41,3±1,86	44,71±3,27	>0,05
7.	Enclosing of a rival	43,9±2,57	45,27±2,56	>0,05
8.	Interception of a ball	29,2±2,71	28,45±2,61	>0,05
9.	Selections of a ball	51,4±2,71	57,36±1,67	>0,05
10.	Kicks on a goal by a foot	60,39±4,33	45,11±4,95	<0,05
11.	Kicks on a goal by a head	61,5±10,77	40,14±10,52	>0,05
12.	Penalty kicks for the 11th	100	50	-
13.	Penalty kicks in an attack zone	51,11±11,07	67,2±8,85	>0,05
14.	Corner kicks	55,27±5,3	62,9±6,63	>0,05
15.	Throw-in of a ball	20,24±2,25	9,9±2,18	<0,01
16.	Total:	32,06±1,43	34,34±1,53	>0,05

A tendency to the reduction (improvement) of a defect coefficient in comparison with the 23rd championship is noticed in indicators of technical and tactical actions of the team "Helios" of Kharkov for the 24th football championship of Ukraine. Such actions are: reception of a ball, kicks on a goal by a foot ($p < 0,05$), kicks on a goal by a head. Considerably only a

defect coefficient decreased ($p < 0,01$) when performing a throw-in of a ball from behind a sideline.

During the supervision over home games one penalty kick of the penalty area was realized and one isn't realized, unlike 23 championships when all penalty kicks which were appointed to the gate of the rival didn't come to the end with a capture of the gate.

Indicators of different types of attack and defensive actions and their efficiency were registered among team indicators (tab. 4).

Table 4

Attack and defensive technical and tactical actions of the team "Helios" of Kharkov in 23 and 24 football championships of Ukraine in the first league (on average for a game), $\bar{X} \pm m$

Nº	Technique-tactical actions of activity	23 championship (n=10)	24 championship (n=13)	p	
1.	Number of attacks of the team	Successful	21,5±2,29	20,91±2,07	>0,05
		Failed	103,9±7,1	130,83±5,97	<0,01
		Total	125,4±8,8	151,66±7,08	<0,05
2.	Efficiency of attack actions of %	16,95±1,19	13,64±1,12	>0,05	
3.	Efficiency of defensive actions of %	84,8±1,1	89,24±1,04	<0,01	
4.	Number of attacks of the team of the rival	Successful	17,2±1,55	14,33±1,61	>0,05
		Failed	97,1±7,0	119,0±5,84	<0,05
		Total	114,3±7,9	133,33±6,29	>0,05
5.	Efficiency of attack actions of %	15,01±1,07	10,62±1,06	<0,01	
6.	Efficiency of defensive actions of %	82,97±20,3	86,33±1,11	>0,05	
7.	Number of the getting attacks of the own team	Successful	20,3±2,2	20,91±2,07	>0,05
		Failed	63,0±4,15	71,16±3,34	>0,05
		Total	83,3±5,2	92,08±4,96	>0,05
8.	Efficiency of attack actions of %	24,2±1,88	22,18±1,44	>0,05	
9.	Efficiency of defensive actions of %	78,86±1,34	80,05±2,11	>0,05	
10.	Number of the getting attacks of the rival team	Successful	16,3±1,12	14,33±1,61	>0,05
		Failed	61,2±2,97	60,25±6,59	>0,05
		Total	77,5±3,36	74,58±6,69	>0,05
11.	Efficiency of attack actions of %	21,05±1,34	19,89±2,09	>0,05	
12.	Efficiency of defensive actions of %	75,7±1,88	77,73±1,45	>0,05	

In the 24th championship the team "Helios" of Kharkov carried out more ($p < 0,01$) attacks which were broken by the rival in comparison with the previous season of 2014/2013. Not so, the team carried out more ($p < 0,05$) attack actions. Considerably ($p < 0,01$) the efficiency of defensive actions of the team grew. ($p < 0,05$) The number of the broken attacks of the rival rose. However the efficiency of attack actions considerably decreased ($p < 0,01$). During the registration of the attack action were divided into fast and position attacks (tab. 5).

Table 5

Average values of fast and position attacks of the Helios team and their efficiency in 23 and 24 football championships of Ukraine in the first league, $\bar{X} \pm m$

Seasons	Total quantity	Fast attacks			Position attacks		
		Quantity	% among all attacks	Efficiency, %	Quantity	% among all attacks	Efficiency, %
23 championship (n=10)	119,7±6,67	84,0±4,95	70,27±2,09	17,09±1,26	35,7±3,43	29,73±2,09	17,84±2,5
24 championship (n=13)	151,66±7,08	117,16±8,14	76,44±1,99	12,48±1,56	33,83±2,98	22,7±2,24	19,59±1,52
p	<0,01	<0,01	<0,05	<0,05	>0,05	<0,05	>0,05

The total number of fast and position attacks increased ($p < 0,01$). However it happened due to a bigger number of fast attacks ($p < 0,01$) which percent among all attacks increased ($p < 0,05$), and also their efficiency improved ($p < 0,05$), and the percent of position attacks decreased ($p < 0,05$) in comparison with the previous season.

Conclusions:

1. The model team characteristics of technical and tactical preparedness are defined which are possible for comparing to indicators of the previous championships where the team "Helios" of Kharkov, and also with the experts specified in references took part.

2. The number of negative receptions of a ball (stops) and negative long passes forward increased.
3. The number of positive and negative interceptions of a ball at the rival decreased. Team players of the team "Helios" began to make fewer mistakes at a ball throw from behind a sideline.
4. The defect coefficient in reception of a ball, in kicks on a goal by a foot, kicks on a goal by a head decreased (improved). Considerably the defect coefficient decreased when performing a throw-in of a ball from behind a sideline.
5. The team "Helios" of Kharkov carried out more attacks which were broken by the rival. Not paying attention on it, the team carried out more attack actions. Considerably the efficiency of defensive actions of the team grew. The number of the broken attacks of the rival rose. However the efficiency of the attack actions considerably decreased.
6. The total number of fast and position attacks increased. However it happened due to a bigger number of fast attacks which percent among all attacks increased, and also their efficiency improved, and the percent of position attacks decreased in comparison with the previous season.

Prospects of the subsequent researches. Pedagogical supervisions over a game activity of this team for correction of the educational-training process and successful performances will be continued in the subsequent.

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