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Norms, standards and tests in the structure of the construction of monitoring physical development, physical fitness and physical state

Abstract. ***Purpose:*** *To determine the structure of the construction of monitoring physical development, physical fitness and physical state of the controlled segment of the population.* ***Materials and methods:*** *analysis of scientific literature on the research, the use of statistical material anthropometric data local population, the use of attributive semantic spaces for the presentation of the individual features of physical development and physical readiness of local population.* ***The results:*** *the structure of the construction of monitoring physical development, physical fitness and physical state as the basis for statistical process control capabilities of the physical capacity of the country's population.* ***Conclusions:*** *The certification of the physical condition and the physical capacity of the country will allow purposefully control the physical development of the population, taking into account regional, climatic and social conditions in the planning of its economic potential.*

Key words: *monitoring, biological age, norms, standards, criteria of physical development.*

Introduction. Monitoring of physical development, physical fitness and physical state is the basis of statistics of physical development and health of children, which serves sub-sector of health statistics. Its main task is the development and the timely receipt of reliable, scientifically sound data on morbidity, physical development of the population as a whole and its separate groups in order to develop measures to improve the health status of the population [1,2]. This issue is of particular importance in our country, which is marked next to resolutions of the Cabinet of Ministers of Ukraine.

In Ukraine, on January 15, 1996 №80 was approved by the Cabinet of Ministers "Regulations on state tests and norms of physical fitness assessment of Ukraine's population." The ruling was issued in accordance to Article 26 of the Law of Ukraine "On Physical Culture and Sports" and the state program of development of physical culture and sport in Ukraine. Resolution of the Cabinet of Ministers of Ukraine dated November 5, 2008 №992 recognized as the loss of the significance of the decision of 15.01.1996 year №80. From August 31, 2011 №828 the Cabinet of Ministers adopted a decree on approval of the concept for the National Programme for the Development of Social Physical Culture and Sports for 2012 - 2016. It noted that "the way of life of the population of Ukraine and the state of the sphere of physical culture and sport are a threat and a significant challenge for the Ukrainian state at the present stage of its development."

In the Kharkiv State Academy of Physical Culture, from 2010 onwards, systematically carried out research work in the sphere of physical culture and sport in Ukraine in accordance with the master plan for 2011 - 2015. Research topic - "Theoretical and methodological bases of construction of system of mass control and assess the level of physical development, physical preparedness of various groups of the population." Currently conducted research under the project "Innovative approaches to health-forming technology in the school physical education." Implementation of the research on these topics is aimed at the development of science-based approach for constructing a national system of physical education and creating a culture of healthy lifestyles.

The purpose of the study is to determine the structure of construction monitoring physical development, physical fitness and physical state of the controlled segment of the population-based screening control of specific features of all components of the monitoring framework.

Purposes of the study:

1. Identify the necessary standards and to develop appropriate tests to ensure the evaluation of the individual characteristics of physical development, physical fitness and physical state.

2. To systematize the assessment of the physical structure of the development, based on the account of biological age and the variability of its course.

3. Present a possible systematization of the existing age variability of physical development available to its characteristics of physical fitness and physical state.

Materials and methods. An analysis of the scientific literature on the research, the use of own materials inspection contingent of children of preschool and early school age. Using special attributive semantic space needed to represent the qualitative differences of the individual physical development and physical fitness of children. Ordering of the features of the observed differences in physical development and physical fitness of children develop methods for estimating slichimosti qualitative structure of multicomponent objects.

The results of research. Building a state of physical education based on systematic monitoring and processing the data to determine the corrective measures arising deviation standards of physical development of the population. The rate of physical development is based on the laws that ensure sustainable viable state of the body, which is manifested in the continuous flow of adaptive devices operational dynamics of the behavior of "normal" state. [3] The essence of this process is related to the rate of morphological and functional maturation of the biological systems of the body. One of the difficulties of solving this problem is to define a clear approach or establish the true biological age. Using Passport (chronological) age does not allow to correctly interpret the results of monitoring, because in a certain chronological age accurately observed significant heterogeneity contingent on your biological age. At the heart of the construction of the existing regulatory performance is statistical analysis of empirical data that allows you to create a general idea about the state of the population. Norma controlled assessment process in this case is the expectation of the resulting distribution and the degree of deviation from the established norm, reflecting the variability of its structure, is measured in fractions of Sigma.

The need for state standards required to establish the qualitative structure of physical development, determining the measure of remoteness controlled performance of their rules and the proper order of the measured characteristic in the ranked list of their submission. This allows you to reflect the qualitative assessment of the characteristics of the individual. In all cases, the size of the standard acts, playing the role of a comparative measure against which determined the distribution of the surveyed population. In practice, the value of the standard can be chosen arbitrarily, equally as any value is taken manifestations characteristic target population. Regarding the comparison of selected measures (standard) can assess the dynamics of development of the individual, or the rate of its current state, or the same performance characteristics of the population. The standard may remain the same as the comparison measurement unit at any time and in any geographical area. If selected as the standard norm, the standard speaks of her synonymous. However, in general, this change is incorrect. In this case it acts as the equivalent of the standard norm. An integral part of the monitor is the presence of test by which the measured expression controlled trait. Concerning the nominated test requirements of adequacy measurement controlled characteristics. The physical training is equally as in any other, always distinguish the general and special training. As a rule, in the assessment of general training includes the task of determining the level of the overall capacity to ensure controlled display options, and special training is to ensure quality of redistribution of the existing potential in the formation of a dynamic stereotype of behavior for the corresponding professional orientation activities. If you touch the general physical training, it should reflect the overall level of preparedness to perform basic, found in all cases of life motor acts such as walking, running, jumping, throwing, swimming. As used in this test should assess the amount of work done, the speed of its implementation, the accuracy, the amplitude of movements performed, the power to overcome the resistance, agility, select the desired solutions. Each of the selected motor characteristics is quantified, represented in the characteristic for their measurement, dimensional units. Different ratios exhibited motor qualities in providing motor actions generate particular variation of its construction, which is the specificity of sport specific movements. For comparison, the qualitative structure of the physical construction of the individual readiness of their absolute values must be translated in relative values - interest share units sigma distances from the expectation or the norms of distribution, which is set in a community survey.

This method allows a comprehensive analysis of the special and general fitness. In this case, the special role played by the standard against which the comparison is evaluation. It should be noted that in addition to the independent choice of the standard of comparison as the boundaries of the reference comparison, the standard can serve a function with respect to which the controlled variable. In assessing such qualities as endurance, you must allocate its absolute and relative performance. Absolute characteristic of endurance is characterized by time spent on the work of a given intensity or volume. In this case, a test to evaluate the performance of endurance is necessary to establish the nature of changes in the job given intensity.

In formulating the problem of choosing the optimal speed of execution of work to achieve its maximum volume in the allotted amount of time necessary to establish the optimal speed of its implementation, that is, its power or intensity, and take the time interval of the conservation of high intensity. Deviation from this period of time the optimum flow rate of work (its intensity) will be determined by the ratio of the average speed to the largest: (Nmean) / Nmax$\leq$1, where N - the power or intensity of work; N = A / t; A - work; t - time.

When this ratio is equal to unity level of physical fitness in relation to perception and balance of its forces or of special endurance reached its perfection. This operation can be performed in the evaluation of a difference of the average and maximum intensity: Nmax - Nmean $\geq$0. In the first case we received a dimensionless parameter, expressed as fractions of a unit, and the second figure is measured in units of dimension kg, m, c^{-1}, which is less convenient for comparing different dimensions.

Presentation of all kinds of survey quality structure of motor activity with the use of a single standard for each motor allows you to build quality generalizing individual characteristics of special physical preparation. A survey of the observed contingent considering biological age and used by non-dimensional representation of the level of physical fitness of motor characteristics allows you to set the relationship between the qualitative representation of the structure of the body and it adequate qualitative and quantitative structure of physical fitness.

The use of physical fitness assessment based on a comparison of the results desired and the average use of a versatile and can be used in any sport or any professional activity. The average result is always the best mode of performing the work, no matter what kind it is not expressed [4]

The duration of the implementation of physical work is defined by its intensity. In turn, the intensity of the mode of operation determines the fractional value of metabolic components, which influence the character of the development of fatigue. If after these accumulated residual effect no recovery, accordingly, the possibility of changes to show the previous maximum effect, but the changes and the average result. Standing remains only their attitude. It is the ratio of these characteristics, if they both belong to the same person, endurance determines the level of special physical readiness. The direct empirical studies to establish patterns of communication require processing of large amounts of empirical data, that at one time performed Y.I. Trofimets [5]. The effectiveness of using an index comparing the best results with an average assessment was tested in endurance athletes special physical training riders. However, the theoretical conclusion acceptable to any type of activity. The versatility of the result of research is that it carries on any activity having a cyclic repetition of its execution. In carrying out the cyclical nature of motorcycle racing is the fact that the athlete passes the track competitions several times repetitive circles. Each circle is characterized by speed of passage. If you choose the best result of the speed of passage of a circle (tl) and correlate it time to time average velocity (tmean), which is represented as the passage of the entire route, divided the number of laps, then the index of endurance special physical preparedness (DP) will have an expression: SP = tl / (tmean), where 0 <n $\leq$ 1. In this case, less than the joint venture, the worse the special training. If this coefficient is used to estimate the degree of complication of the job in the present example, this time during the passage of one circle and to activate tasks after start, it is possible to quantify the influence of task difficulty or

complication. In this case, this factor can be characterized as a measure of the solubility of the job or for the development of accessibility.

If you exercise consistently change in the index (JV) for the development of the job, its dynamics indicate the rate of learning or adapting to this level of complexity. Establishing a consistent increase in the absolute value of the complexity of the task and change (SP) to the level of the asymptotic behavior (the point where the value does not change in the interval (0 <n <1) indicates the limit of learning. Change (SP) in adjusting to the increasing load reflects the rate learning. The remoteness of the asymptotic value (DP) of 1 indicates a marginal distinctiveness, which is available to the individual in its current state and the possibility of improving technology in overcoming the imposed job complexity. The versatility of this indicator is due to the fact that the basis of his behavior is an exponential function, which is for all its transformation remains unchanged [6]. This fact allows using a set or selected standard against which assessed physical fitness, set the level of individual physical fitness of both qualitative composition, and the level of availability of the absolute values of the load for each biological age based on the individual the nature of its course.

Quality orientation of physical fitness as the general and special, estimated specific to their professional orientation. If the standard is the level of respect of which the assessment of physical fitness, the tests reflect its quality orientation. The level and quality orientation of physical fitness of the border have access to every biological age. Determination of the arsenal of physical activity in terms of its qualitative and quantitative availability of each biological age is the basis for building a state system of physical education. The relationship between the concepts of standards, norms and tests, it should be understood that the standard serves as a reference level against which the comparison is held private observation. The standard can be selected norm - a characteristic that is the most stable and most frequently observed in a population-based surveys. The tests are the focus of a specialized assessment of the level of physical development of the individual deviations from the established standard of quality and reflect the structure of the development. On the basis of this kind of information it is possible to carry out science-based construction of a national system of physical training of the population.

In this regard, in the past the most effective evaluation system of physical fitness of young people was a complex BGTO and TRP. The absence of a period of sufficient knowledge of the individual, regional and population norms have resulted in 80 years of the twentieth century to the accumulation of significant discrepancies use of physical education of its tasks and thorough review of its appropriateness, that ended in the rejection of its use and the loss of much experience, expressed Statistics accumulation of information about the delivery of standard regulations and on the basis of physical fitness assessment of students. Currently in Russia, China re-introduced a similar system of government control over the level of physical development, physical preparedness and fitness of the population.

A major shortcoming of the previously held annually monitoring the physical fitness of students was to evaluate the results of putting established standards in strict accordance with the age rules, without taking into account individual features of physical development, and the existence of regional norms, defining not only the specifics of the physical development, but also the time of the biological maturation of the body. Only since the 80s of the last century to raise the issue of regional standards of physical development and assessment standards of physical fitness age in their respective regions. During this period, I addressed the question of determining the age of school readiness. The desire to scientifically substantiate the beginning of schooling of children six years of age has led to government programs “child health”, “student health”, aimed at studying the characteristics of the individual development of children of preschool and early school age. Research in this area conducted by PI “Institute for the protection of the health of children and adolescents is much” (Kharkov) in Kharkiv and Dnipropetrovsk regions, allowed to establish the range of variability of the age of school readiness among the local population of children 6 years of age, which was ± 2 years [7]. Studies have not received their further development due to lack of time on well-founded scientific basis of the reasons for the differences between the passport and biological age. The fact of the variation with respect to the biological age of the passport proved insufficiently studied and the limits of variation with respect to the biological age of the passport are not installed. In addition, no single approach has been developed determine biological age, and existing methods gave very different results in terms of their application to a single individual.

The work carried out in the Kharkiv State Academy of Physical Culture [8; 9], given a reasonable understanding of the mechanism of individual physical development and the nature of the variety of features displays structures of biological age. The results obtained allowed to justify not only the focus of a variety of high-quality biological development of morphological and functional structures, but their rate of biological maturation [10]. This fact allowed to justify the existing difficulty of assessing the child’s body type as a child, and the reasons for his “drift.” Quality variation of morphological and functional maturation of biological entities define the general direction of development and the rate of maturation. minimally sufficient criteria for tracking indicators of this fact are the height and weight of the child, that it is advisable to monitor the month during the first year of life, and at least half a year in the next 3 years of life. The accumulated material with sufficient accuracy to determine the changes in growth and development, as well as their rate of flow [11].

The presence of two anthropometric characteristics of height and weight allows for a comparative analysis of the inter-regional standards of physical development, received at the same time collect information by region or of the region in different years of gathering information, and physical development of the individual with respect to normal physical development of the region.

Implementation of such a comparison was made possible by the published statistics Kiev NIIOHMADET. Using data from the dynamics of growth-weights of the same chronological age children 3; 4; 5; 6 years of historical data and 4; 5; 7 years, obtained at different times, you can compare the level of physical development of children of the same age. When comparing the data Rostov-weight ratios of children of all ages a certain region, it is possible to note the nature of the growth characteristics of a weight variation of physical development. With the dynamics of growth-weight ratio for different years of physical development of a region can set individual features of physical development and the biological age of an individual, which is shown in Figure 1.

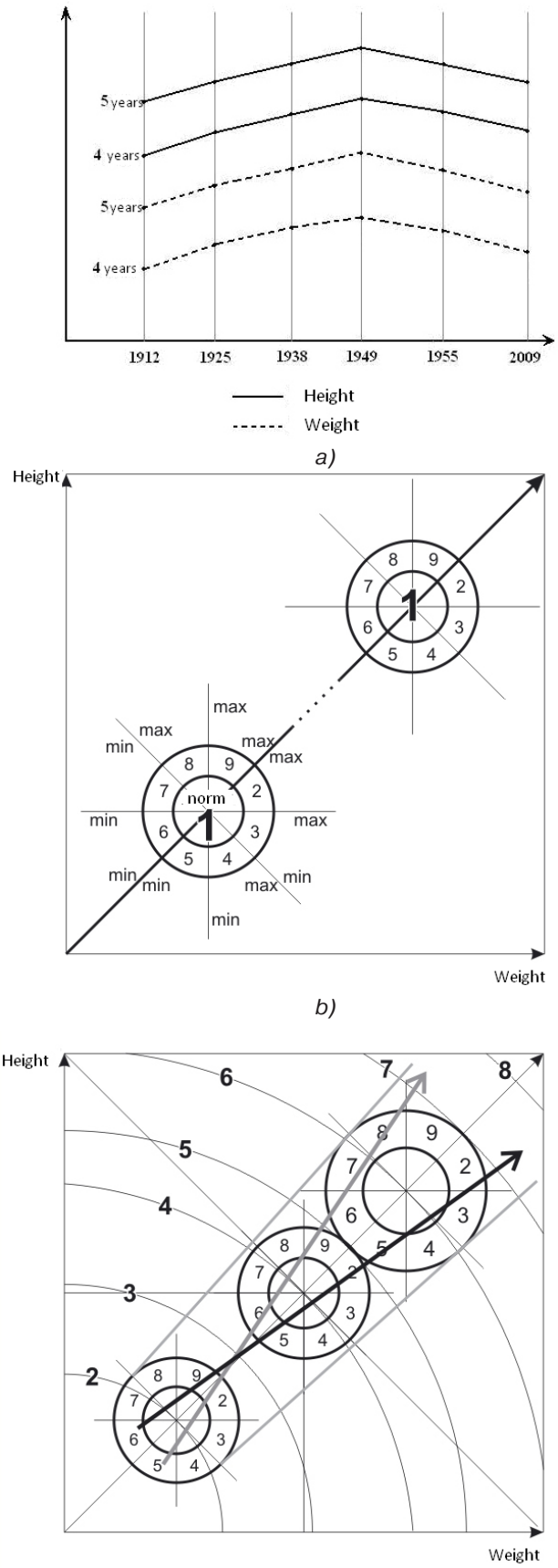

Fig. 1 Age Rostov-weight ratios of physical development in ontogenesis.

Figure a) Diagram of comparison of physical development of girls 4-5 years of 2009 from previous years in 1912, 1925.1938, 1949, 1955. Figure b) Diagram of physical development of children 3-6 years old. Figure c) Diagram of a comparison of the standard and its background line of individual development, which gives rise to the difficulty of determining the structure of somatotype in early childhood (concentric circles - years of life).

Every age can be identified in the development of delayed, normally developing and advanced, as well as the uneven development that allows, in accordance with this graduation highlight nine zones, with characteristic specifics of Rostov-weight ratios.

In these charts use a scale with the standard unit of measurement studied characteristics. The presented results of the characteristics of the subjects relative to the time of their development have a certain trend. Each of the above characteristics has a range of deviations relative to the corresponding values of a trend that reflects the level of lag rules or advance its development. Similarly, the other is characterized by a controlled rate. Their joint performance in feature space is the totality of possible combinations of the speed of development of each of the above characteristics. Their equity ratio determines the viability of the somatotype shaping. Consequently, if in the ongoing monitoring exercise control over each individual, it is possible to set individual features of biological development and direction of movement of its growth index-weight ratio.

In monitoring changes in height, weight, chest circumference and evaluate any indicator of biological age, there is a range of variations of the characteristic values with respect to its mathematical expectation. In the prior art describes the commensurability multidimensional characteristics matched individuals, if necessary detail the structure of their body and directional characteristics of biological age [12]. Normal development is considered to be occurring only where the same characteristics of the expectations of all monitored indicators of biological maturity.

However, to establish a general pattern of this process is sufficient evidence of the dynamics of weight and body length. In each chronological span of physical development of the individual, these two characteristics have a range of variation coefficient of their relationship, which changes (pulses) with respect to its trend. If you think of all the options for change borders weight, height, range ripple these indicators and their average statistical value in the corresponding semantic space is indicative of the results of monitoring carried out systematically monitoring, then it is determined by the general pattern of physical development of the process [13] (Figure 2)

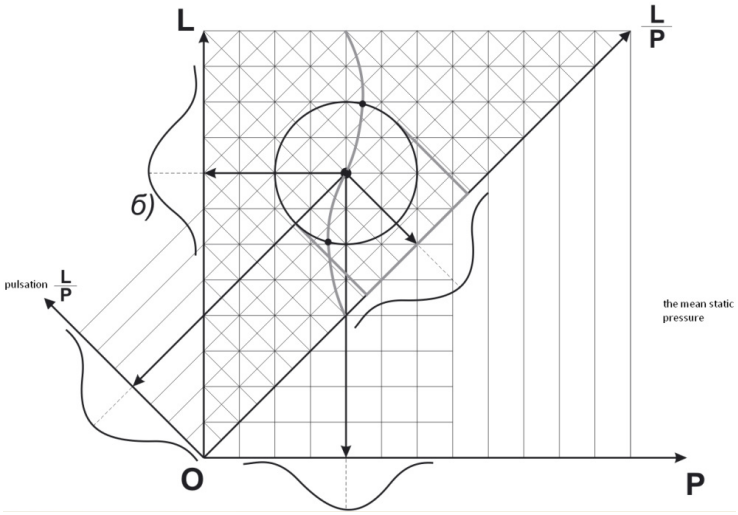

Fig. 2 is indicative of a semantic representation space interdependent relationship growth trend, the weighting of the index; variations in relative growth of constant weight; variations in weight relatively constant growth; *Variations ripple Rostov-weighting factor.*

L - body height (length); P - body weight; L / P - Rostov-weighting factor (ratio of constant relations); pulsation of L / P (trend fluctuation L / P). Each coordinate scale of feature semantic space indicated a normal distribution curves characteristic variation. In the area of the joint display of interdependent relationships integral curve shows signs of a general point, which determines the behavior of the trend factor L / P.

In this case, the physical development of the population is considered as an integral object, reflecting the variability of biological age local population, which is the object. Full analog of these characteristics observed in the physical development of the individual. The difference is that the initial ratio of the individual physical development and the rate of flow have their initial values, which leads to the displacement of their trend over other sectors with respect to its initial position. This movement is most intense in the first decade, which is difficult to determine the child's somatotype. Systematic monitoring of the behavior on growth-weights implemented from the date of birth of the child, allows you to fully carry out its forecast somatotype and predisposition to certain types of physical activity orientation, and provide preclinical diagnosis characteristic of his constitutional diseases.

The established pattern of organization structure of biological age and the rate of flow reveals the features of the individual physical development, which greatly extends the capabilities of the monitoring carried out in monitoring and forecasting the physical development of the population and the planning of its potential mobility. An essential constituent of the physical features of an individual is his physical condition.

Physical condition is an integrated assessment, which includes a physical indicator of the health of the individual, constitute the basic framework of his physical abilities and the potential operational physical capability, which provides a process of adaptive behavior aimed at meeting the needs of preservation of the equilibrium state of the body in response to different environmental influences.

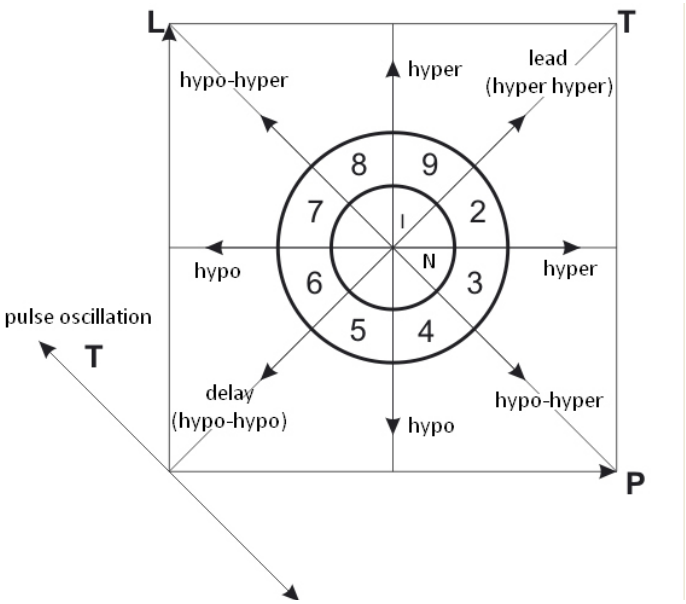

Fig. 3. Dynamics of changes in Rostov-weight ratios in the process of physical development, presented in indicative of semantic space.

L - coordinate axis showing the length of the body; P - body weight; P - ripple variations Simply-weight otnoscheniya; T - the trend of development of standards; N - normal state of relations L / P; (1 - 9) area variation relationship L / P of their rules state relations, reflecting different initial conditions of the individual characteristics of biological development. The radius vector emanating from the H-point, point to the direction of growth and weight violations in individual development and physical features of the structure of biological age.

The term “physical health” has many definitions, and the content is still not a universally accepted definition in terms of the requirements for its quantitative study. World Organisation adopted the definition of “health” as “a state of complete physical, mental and social well-being.” In this case, it applies only to the physical health and the possibility of a qualitative and quantitative assessment, believing that the other components are in compliance with the required standards. The statement that health does not allow direct measurement, as in the existing sources of information do not have information about the direct and immediate measurement of the level of health, not sufficiently substantiated. The reason for this is that such a definition can not be given without the principle of unity of the object and the environment of its existence, considered as a whole education. In this representation, the concept of “physical health” reflects the level of viability of the system “Object - environment” and reduced to the statutory rate of its condition.

The study of quantitative and qualitative characteristics of the health status of the population in general and certain of its individual or the individual’s contingent, revealed a statistically significant association with vitality against environmental factors. Health status in the overall presentation is based on the statistics of morbidity, physical development of statistics, statistics of children’s health and maternity, the receipt of which can provide a systematic monitoring.

The second component of physical condition that determines the physical capacity, physical capacity is operational. Reducing the operational capacity of the state characterized by the development of fatigue. Its occurrence is manifested in various mechanisms to reduce capacity, depending on the specific physical activity performed, and its intensity. In general, for such reasons are: the occurrence of large amounts of metabolic products resulting from the implementation of intensive work.

Paramount in this regard is the accumulation of carbon dioxide (CO2) and the lack of oxygen (O2), which violates the partial pressure of these gases in the blood and reduces the intensity of the oxidation processes. This stage is characterized as “suffocation.”

Immediately following it is shown the accumulation of metabolic products, as their rate of accumulation exceeds the capabilities of functional systems of their removal from the body. As the most typical reason in this case is the failure of the transport function of blood circulation and inconsistency potential excretory systems. This stage is characterized as a “blockage”, leading to disruption of homeostasis.

As you reduce the intensity of physical activity performed by the determining cause of fatigue developed by acts “flow” of energy potential. As it approaches the maximum permissible limit is increasingly affected by stage of “exhaustion”, evokes a feeling of weakness and defense response associated with a decrease or complete cessation of performance.

As an independent factor projecting the cause of fatigue is the coordinating function of the redistribution potential to provide regional blood supply in the emerging request morphological and functional structures of the dynamic stereotype, providing specificity to perform physical activity. This stage is characterized as a “central inhibition.” This division of the factors influencing the development of fatigue in the stage of their impact is conditional and defined common significance in the accumulation of them depending on the intensity of the work. In fact, they are simultaneously present in the process proceeds motor activity. Total limiting their impact, depending on the intensity of the activities carried out, determines the length of its course at an exponential characteristic.

On the physical condition significantly affected by the current state of physical health (physical health) or the health

of the body, which reflects the current state of the organs and systems of the human body; their level of development and functional features. Processes or phenomena in any field, what character they were not always carried out on a specific basis, which allows you to generate the necessary variation of the operational conduct adequate environmental changes. In all cases, the process of building adaptive behavior is possible only if necessary and a sufficient level of total potential readiness for the implementation of the appropriate operational adaptive behavior. Almost always in the background of a certain level of operational readiness of the total proceeds continuous surge in strength, quality focus and duration, necessary to ensure the preservation of operational equilibrium in relations with the media host.

Physical health, as noted above, is one of three components of the general concept of health and has no clear definition and sufficiently unambiguous evaluation criteria. This is a natural phenomenon in the evaluation of complex multicomponent systems. Their assessment and classification depends on the number of dedicated features and actions of their distinctiveness. In this case, the health of a qualitative characteristic, consisting of a particular set and sequence specific to the phenomena of the components and the strength of their severity.

Health, like any phenomenon is an expression of quality and strength of its display, which is the subject of physical condition. Failure to resolve this question was that there were no clear idea of concepts such as biological age and the criteria for its determination, individual norms and basic principles of its adaptation to changing environmental conditions [14]. Establishing the structure of algorithm of the individual physical development and maturation of morphofunctional organism in ontogeny suggest the establishment of individual standards of physical development. On the basis of principles to guide the process of self-organization and the establishment of the essence of the concept of individual standards as a phenomenon and as a process that ensures the preservation of the equilibrium state of the object with the environment of its existence. On the basis of this became possible solutions to issues such as the formation of purposeful adaptive behavior aimed at the preservation of the equilibrium state of the system “object environment” [15].

Depending on the interaction of the object with the medium of his stay, the dynamics of changes in the state regulations may occur in the following ways: change the range of functional optimum position while maintaining the modal values of the state standards; transgression of the modal values of the state standards without changing the boundaries of functional optimum, but move them together with the modal value of the state standards; and all the possible variants with simultaneous participation of the first two. The success of this process is determined by commensurability of the ongoing process of operational adaptation of the rate of change in environmental conditions.

All running processes are reflected in the character of changes in the activity of functional systems. The most accessible to observation in this regard are: the respiratory system, changes the dynamics of the cardiovascular system work, changing sensorimotor reactions. These changes reflect the current operating status, the presence of adequate residual capacity and an indicator of current physical condition.

The monitoring of the respiratory system is possible keeping the frequency and depth of breathing (cycle length and the duration of its phases) for certain time intervals. Each of these characteristics is its change range, which includes the current operating status or level of tension providing an averaged demand, and rapid changes in the adaptation range amplitudes of these oscillations (known as Pulse reserve).

This allows you to identify a potential medium voltage level with respect to which in the corresponding range from the minimum to the maximum limit is pulsating operational regulation satisfy the request. The average potential changes its level, depending on the accumulated surplus or shortage meet the operational regulation. With the change in the average level of change and rapid pulsation border.

Features of these changes may be due to different orientation range limits (max - min). All these characteristics are interdependent in providing the regime meet the current needs of the body. Since they are all measured in the same units, and their interaction can be observed in their present relationships, which are considered indicative of a unified semantic space compared with single measure of performance. This allows you to set a record as the constancy of the observed relationships and constancy of occurrence of these relations in a joint interdependence of functional activity.

Any functional activity, the manifestation of its activity, has a certain level of tension, an adequate level of activity required to maintain a state of equilibrium with the environment, on the background of this state made rapid adaptive behavior, which manifests itself in a certain range of pulsation characteristics manifestation controlled functional activity. This range is determined from the sweep oscillation boundary minimum value to a maximum value of the boundary. As the minimum and maximum level of manifestation pulsating values of functional activity has the morphological and functional mechanisms.

Depending on the operational direction of adaptive behavior of each of their boundaries may increase or decrease as a necessary and sufficient response to the need arose. Each of the states borders operative behavior can be characterized by three areas of change. Of the three options for the status of each of the boundaries of their two joint combination generates the eight options. The level of intensity of the functional system is equal to their arithmetic mean value. That is the sum of the current value of 0.5 minimum and maximum correspond to the trend of the static state.

Graphically this can be represented as follows (Fig. 4)

The plane of the second two-dimensional space is rotated with respect to first 45є. A characteristic feature of this area is in the zone of intersection of the joint behavior of generalizing the point values of all four characteristics describes a pattern that reflects the interdependence of functional relations of a functional system under consideration. This pattern is acceptable to describe any of the functional systems. This marked the scale in the nomogram will have different specific units, but in all cases it will be a ripple on the borders of the state of a running operating system and its trend.

In terms of the cardiovascular system, in particular, the characteristics of the blood pressure; dynamics of its frequency characteristics; muscle tension when performing any motor actions; the work of the endocrine glands.

By virtue of the established general laws of this phenomenon can be obtained separately by the reflections of the functional state of the system to get the general structure of its behavior and on this basis assess the current functional

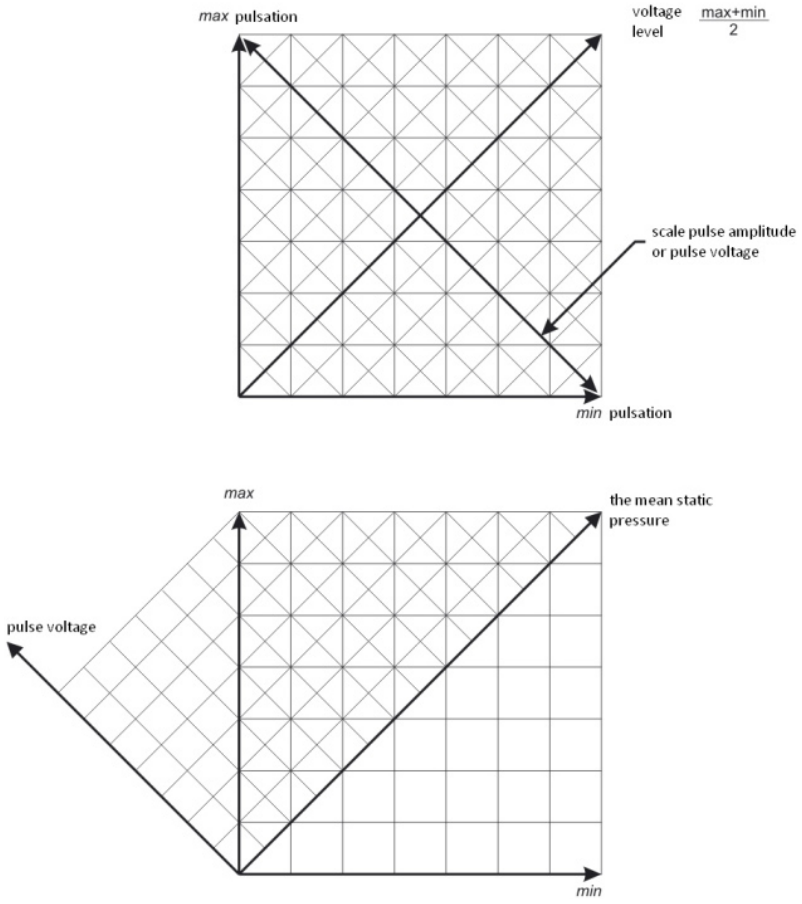

Fig. 4. The space relationship baseline performance characteristics and their derivatives.
a) the initial structure represented by the semantic space of feature; b) the scale of the amplitude ripple is offset along the mid-scale voltage to align statistical began counting all four scales.

status.

Restoration of the overall structure of the physical functional status of individual selective view the current status and their relationship gives the dimensionless quantity, which reflects a constant ratio criterion for the state, regardless of the absolute values. Regarding the boundaries of existence criterion of constancy of occurrence of such a nature constant ratio criterion is given an opinion on the current physical condition, divided into components of the static state or level of physical health and operational adaptation potential or current physical condition, reflecting the level of tiredness of the body as an indicator of a temporary decline in performance. Thus the current state of the division is carried out on the total and incremental in one step to the next state or step "ripple", specific to the general condition (physical health), which acts as an objective assessment of the qualitative and quantitative characteristics of physical condition and physical health.

Conclusions:

The reason for the difference passport and biological age is the mismatch rate of maturation of morphological and functional structures of the body involved interdependent relationships that determine its viability. The variability of this relationship stand out synchronously developing morphological and functional maturation of systems that have a range of differences from the maximum observed delay in development to the maximum occurring timing. In this range of possible simultaneous with sufficiently high accuracy the difference in the chronological age and biological individual.

In asynchronous development of morphological and functional structures of the body is observed allometry of their development, which requires a definition of each of controlled biological maturation index set its rate of maturation and measure the differences from the norm of this process. This inconsistency creates not only a different speed of biological development, but also affect the direction of flow, which leads to a trend of movement of the passage of the individual from one area of the initial state through a number of different, different at the time of controlled. This effect is extremely complicates the task of assessing and predicting the process of biological evolution.

To evaluate the biological age and peculiarities of its course, it is minimally sufficient evidence of growth in body weight and length. For individual control of these parameters correlated to the population or regional standards, with the required accuracy can set the speed and direction of biological development, which allows to determine the dynamics of the somatotype and implement preclinical diagnosis of specific violations of constitutional viability of the organism.

Any functional activities aimed at preserving the life of the organism is based and can be represented by such indicators its functional state, such as: the level of intensity required, the operational adaptation of its pulsation characteristic of the level of tension. Presented in a special indicative of semantic space, the observed fluctuations of controlled features allow for their dynamic to establish the current level of operational readiness (system voltage) characteristic of her rapid adaptation pulsation of this state and to establish the regularity of the trend of functional strength that allows you to set

individual rates of functional state and zone its optimal expression. In evaluating the physical condition of its presentation, this technique allows you to share a basic condition of functional readiness and adaptive swings its activity. Basic readiness reflects physical health, and the boundaries of adaptive fluctuations reflect the level of physical fitness. This result was obtained on the basis of the use of attributive semantic spaces and presented for the first time.

Further direction conducted research related to the development of methods of construction monitoring physical development, physical fitness and physical state in accordance with the subject of scientific research "Innovative approaches to health-forming technology in the school physical education."

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