

# Methodological bases of differentiated control and Evaluation of special physical and functional fitness of swimmers at different stages of long-term sports training

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## Abstract

**Objective of the study** was to substantiate the main provisions of the method of differentiated control and evaluation of the special physical and functional fitness of swimmers at the stages of sports training.

**Results and conclusions.** It is noted that the diagnosis and assessment of swimmers' preparedness should be differentiated according to the following indicators: at the initial stages of training, the assessment of preparedness should be carried out mainly in terms of morphofunctional power indicators, at the stage of sports improvement - in terms of mobilization capabilities and at the stages of higher sportsmanship - in terms of the efficiency of the functioning of all body systems. Thus, the complex control of the special physical and functional fitness of swimmers should be based on a differentiated assessment of the main, dominant factors that determine the special physical performance and, ultimately, the actual sports result, at different stages of long-term sports training and reflecting biological and physiological patterns of development of adaptability to physical activity, taking into account the individual typological characteristics of athletes and their sports specialization. It is noted that the assessment of individual indicators of swimmers, associated with the calculation of intermediate and calculated indicators, ranking and their visualization, should be automated to the maximum extent based on digital technologies.

**Keywords:** swimmers, special physical fitness, functional fitness, stages of long-term training, control, evaluation.

**Introduction.** The effective implementation of the training of athletes is largely determined by the objectivity of monitoring the level of special preparedness, carried out on the basis of monitoring the most informative indicators that reflect the leading aspects of the activity [1,3,10]. In this regard, the development and methodological substantiation of the methodology for differentiated control and evaluation of the special physical and functional fitness of swimmers, depending on the degree of involvement of various factors in their provision at the stages of long-term sports training, is very relevant.

**Objective of the study** was to substantiate the main provisions of the method of differentiated control and evaluation of the special physical and func-

tional fitness of swimmers at the stages of sports training.

**Results of the study and their discussion.** The special physical and functional readiness of swimmers is currently considered as a property of a trained organism, integrating a number of components that, to one degree or another, determine special performance and, in fact, the sports result itself.

Physical and functional readiness is formed due to the integrated functioning of various components, as a result of which specific manifestations of the activity of individual elements of the general structure are always interdependent [1, 9, 11, 12]. It should be noted that the functional capabilities and mechanisms that determine them, to a large extent, also depend on



such properties as power, mobilization, stability and economy [7], considered as qualitative characteristics of the functioning of the physiological systems of the body [1, 8, 9, 11].

At the same time, it is known that an increase in the level of special physical fitness in the process of long-term adaptation to physical loads occurs due to various factors that determine it [4, 7, 11].

It is shown that at the beginning of the process of long-term adaptation of the organism to physical loads, special physical fitness is largely determined by the high level of "morphofunctional power" factors. In swimming, power factors are expressed in indicators of physical development (length and weight of the body, volume of muscle mass, etc.), indicators of the power of energy supply mechanisms (maximum oxygen consumption, glycolysis power, etc.), indicators of the power of the muscular system (maximum strength, strength thrust on land and in water), total external mechanical power ( $P_{t0}$ ), etc. [1].

At the stages of sports improvement, along with the factors of "power", special physical performance to the greatest extent depends on the factors of "mobilization". At the same time, the importance of the factors of "economics" is also growing. In sports swimming, these factors include, for example, indicators of maximum swimming speed ( $V_{max}$ ), coefficient of use of power capabilities in water, etc. [1].

At the final stages of a long-term training, the factors of "economical" functioning of physiological systems have a dominant influence on sports performance while maintaining a high value of mobilization capabilities [1, 11]. Directly during swimming, the threshold values for aerobic and anaerobic metabolism, active resistance during swimming, the coefficient of coordination of movements in water, etc. are most often used as criteria for functional efficiency [1, 2].

Thus, the biological basis of the methodology for differentiated control and assessment of the preparedness of swimmers should be considered the idea of a stage-by-stage sequential development of certain physiological mechanisms and functional properties of the body that underlie the increase in the level of adaptation of the body to physical loads and the expansion of functional capabilities. organism [1, 4, 7, 11].

When determining indicators for assessing the functional and special physical fitness of swimmers and selecting tests to obtain them, we proceeded from several provisions.

The first provision determines the consideration of the significance of various factors and indicators that reflect them in determining the level of special physical and functional fitness and sports results as their main integrative indicator (at the initial stages of long-term training of swimmers - factors of morphofunctional power, at intermediate stages - factors of mobilization, and at the end - the factors of profitability).

The second provision is due to the fact that the selection of indicators for differentiated control is determined by the maximum correspondence of these parameters to the real conditions of the specific activity of the athlete and their greatest impact on the sports result, which makes it extremely necessary to determine the degree of relationship between the actual sports result and the results of tests used for control. special preparedness [3].

The third component of accounting was the availability of the methods used for diagnosing the level of preparedness. Practice shows that even biochemical control is inaccessible for a wide range of athletes, especially in the early stages of many years of training. In this regard, it makes no sense to recommend, for example, biochemical indicators or gas analysis indicators to assess the preparedness of young swimmers.

The fourth condition that was taken into account is the number of indicators used for control. It is known that the control of 5-6 parameters provides an estimation error of 10-15%. With an increase in the volume of diagnosed indicators, the accuracy of the integrative assessment increases slightly [6]. Proceeding from this, it seems quite sufficient to use 5-6 most informative and reliable indicators that adequately reflect the dominant components of swimmers' preparedness at one or another stage of a long-term training.

The fifth condition reflects the reliance on the use of specific swimming tests to control the readiness of swimmers. The results of these tests, differentiated depending on age (orientation to biological age), swimming method, remote specialization, energy supply mechanisms (pulse zone), allow us to get an idea of the special physical and functional fitness of swimmers in a particular period of a large training session. th cycle. In addition, swimming tests are available for implementation with swimmers of any age and with any equipment of the training base.

The sixth provision, which was taken into account when forming a testing complex for assessing the preparedness of swimmers, is the conditional division of all swimmers into three main groups, depending on



the stage of many years of sports training and on the level of preparedness. At the same time, the criterion for attributing swimmers to a particular group is the level of sports performance. To be able to compare estimates of indicators of different dimensions, it is advisable to bring them to a single scale (normalization) according to the method of constructing evaluation scales of "selected points" [5,12].

Seventh position. It is advisable to automate the entire procedure for evaluating the individual indicators of swimmers, associated with certain calculations, ranking and visualization, through the use of digital technologies. On the basis of direct indicators according to a given algorithm, a number of intermediate parameters are calculated, all input indicators are ranked and evaluated in accordance with a given scale, and an assessment of two types is issued in digital and graphical form: an integrative assessment (issued as an average score of only the entered indicators) and a differentiated assessment of each indicator separately (allows you to obtain information about the "strong" and "weak" sides of the swimmer's preparedness and the ratio of their level).

**Conclusions.** Based on the foregoing, it seems to us that the assessment of the special physical and functional fitness of swimmers at different stages of a long-term training should be differentiated according to the following indicators: - in terms of mobilization capabilities and at the stages of higher sportsmanship - in terms of efficiency of functioning of all body systems.

Thus, the complex control of the special physical and functional fitness of swimmers should be based on a differentiated assessment of the main factors that determine the level of special sports performance at the stages of long-term training and reflect the biological and physiological patterns of development of adaptation to physical loads, taking into account individual typological features. athletes and their sports specialization. It is advisable to automate the assessment of individual indicators of swimmers, associated with calculations, ranking and visualization, to the maximum extent on the basis of digital technologies.

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