



Substantiation of the concept of technical and physical training of swimmers in a long-term training cycle

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Abstract

Objective of the study was to scientifically substantiate the concept of technical and physical training of swimmers in a long-term training cycle.

Methods and structure of the study. To solve the tasks, we used the material obtained as a result of many years of research of 607 swimmers at the training stage (three years), the stage of improving sportsmanship (three years) and higher sportsmanship (two years), questioning 49 coaches of sports teams. Biomechanical (computer video analysis, analysis of intracycle swimming speed, analysis of dynamic parameters), pedagogical (physical fitness testing), physiological (blood lactate) methods were used in the work.

Results and conclusions. Synergistically coupled training means and additional methods of physical and technical training based on the achievement of a systemic effect (emergence) have been developed. Based on the identification of significant parameters of physical and technical readiness, which have a high specificity, a variant of constructing the training activity of swimmers was found, in which physical and technical training are combined into one integrative system - technical and physical training. Thus, the allocation of technical and physical training as a single part of the training process due to the achievement of a synergistic systemic effect (emergence) allows us to determine a new direction in the planning, systematization and management of sports training components, which contributes to the achievement of higher sports results.

Keywords: *technical and physical training, swimmers, synergism, contingency, training means, long-term training, concept.*

Introduction. The modern system of sports training presupposes the presence of its separate, private types - physical, technical, tactical, psychological [2-4]. Sometimes integral training is also singled out, although its content is not entirely clear. It is clear that the division into separate types of training is conditional, however, in sports practice, their content is characterized by a specific focus, allocation in the planned training cycles, control of the level of development, etc. Given the ever-increasing competition in sports arenas, it is futile to wait for the solution of tasks to achieve higher sports results due to a further increase in the volume and intensity of training loads [2, 3]. New approaches should be sought, in particular, based on the integration, conjugation, and interaction of individual training tools.

The conceptual position of this work is the definition of new approaches to the system of formation of sportsmanship of athletes, based on the ideas of integrating the physical and technical training of swimmers in a long-term training cycle.

Objective of the study was to scientifically substantiate the concept of technical and physical training of swimmers in a long-term training cycle.

Methods and structure of the study. 607 swimmers took part in the scientific work, 527 of them in the ascertaining, 58 in the forming and 21 in the local experiment, as well as 49 coaches of sports teams. The duration of the experiment was eight years and affected three stages of sports training: training (three years), the stage of improving sportsmanship (three years) and higher sportsmanship (two years).

The following methods were used in the work: biomechanical (computer video analysis, analysis of intracycle swimming speed, analysis of dynamic parameters), pedagogical (physical fitness testing), physiological (blood lactate).

The training plans of the athletes of the control groups were not changed and were carried out in strict accordance with the regulations of the Federal standard of sports training for the sport - "swimming". Synergistically coupled training means and additional methods of sports training based on achieving a systemic effect (emergence) were introduced into the training programs of the experimental groups.

Results of the study and their discussion. When pairing the means of physical and technical training, the task was to strengthen the training effects in the programs at each of the sports stages. When the selected training means are merged, their interaction becomes more pronounced, which makes it possible to achieve flexibility in planning the training process and achieve a greater effect than with the traditional approach. In our works [1], the effectiveness of a combination of such means was proved and described when performing movements on land using the VASA Ergometer simulator and in water.

Thus, integrating the means of physical and technical training in the training process, without violating the integrity of the form of movement, but only strengthening the influence of some exercises on others, in our opinion, the synergism of training will manifest itself, which in turn will form a systemic effect or emergence of the entire process of managing the sports training of swimmers. This dictates the introduction of a new concept - technical and physical training.

The system of movements that form the cycle of movement in the technique of swimming is a priori subject to changes caused by the biological maturation of the athlete, on the one hand, and the influence of the coach, on the other. The acquisition of system stability in this case can be considered from the standpoint of the formation of a dynamic stereotype. For qualitative transformations of the motor action system, in our opinion, it is inappropriate to allow the creation of stereotypes in the structure of the swimmer's movement.

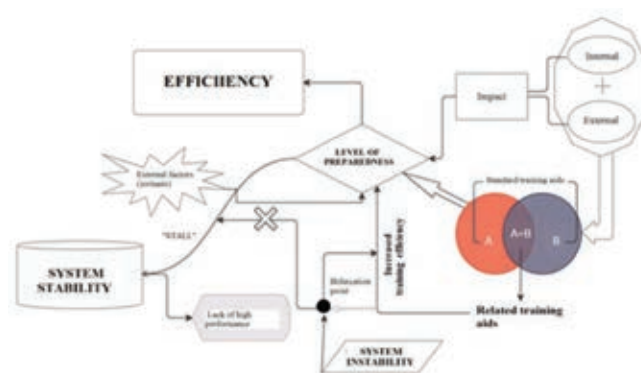
Of course, the sequence of phase trajectories in the structure of the cycle, their forms, vector directions and others are formed and fixed in the swimmer for life, but in the most general form. However, in order

to be able to change the structure of the movement in order to improve it, it is necessary to "leave" the field for making adjustments to the form of movement, that is, not to bring it to automatism.

As our studies have shown [1], the form of a swimmer's movement is changeable and technical readiness is associated with the level of development of physical qualities that fill the form with content. The results of the ROC analysis, which made it possible to identify specific parameters that affect the "gold standard" of training - the maximum swimming speed, showed that not all biomechanical characteristics retain high specificity in a long-term training cycle, but only some (for example, power and acceleration of hand movement in the phase pull-ups), that is, the stability of the swimmer's movement system is not so rigid.

One of the characteristic features of the technical and physical training of swimmers is concentration - focusing on a time-limited stage of preparing loads of a certain predominant direction and breeding loads with different directions of training influences in time. The concentration of loads provides the possibility of a massive specialized impact on the athlete's body, and the breeding of loads in time - the achievement of a sustainable adaptive effect from the use of each of them. The scheme of manifestation of the systemic effect or emergence within the framework of the implementation of technical and physical training is shown in the figure.

Thus, the level of preparedness of swimmers is determined by the effectiveness of internal and external influences, where, according to the theory of L. von Bertalanffy [5], standard training means (A and B) are combined into conjugate (A + B), synergistically enhancing the effectiveness of each other.



Scheme of technical and physical training of swimmers based on the manifestation of a systemic effect



The use of such synergistically coupled means in training programs contributes to the appearance of increased training efficiency and, accordingly, affects the level of technical and physical fitness. However, in the described scheme, it is necessary to take into account external stimulus factors (psychological, physiological, etc.), which can negatively affect the level of preparedness of swimmers. At the same time, the system (in terms of "preparedness") will be subject to the so-called "dumping" into a stable position, in which the level of development of the system will be reduced to zero if it does not show degradation.

In this case, it is advisable to include in the technical and physical training programs the means of the so-called stress impact, which will lead the system away from a stable state due to "stall". The use of such means in this case acts as a bifurcation point, overcoming which, the system acquires an unstable, that is, a more flexibly developable state.

Thus, in order to achieve a level systemic effect, it is necessary to select conjugate means of training and strictly regulate training loads. However, it is not advisable to achieve the stability of the system, since its manifestation will lead to the so-called "dead end" in the development of the athlete's preparedness.

In order to create conditions in the process of training to increase the training effect, it is advisable to talk about the allocation of training patterns that will have ramifications in their direction and depth of impact. Any branching is the choice of the coach based on the already achieved level of preparedness of the athlete.

In any case, the emergence of division into patterns at the bifurcation point is an inevitable process in terms of technical and physical training of swimmers. For example, when making adjustments to the swimming technique, the athlete is invited to perform the exercise at various levels of load - aerobic, ANOT and anaerobic-glycolytic, however, if the corrected element was not stabilized at any level of load, then some violation of the integrity of the system occurs. In this case, it is necessary to return to a lower level to introduce other conjugate means of physical and technical training into the training process, enhancing the effect of those already learned. This moment will be the bifurcation point that determines the choice of a controlled way to improve the swimmer's technical and physical fitness.

After conducting research in terms of searching for the interface between technical and physical training, and highlighting significant parameters with high

specificity, a variant of planning the training activity of swimmers was found, in which physical and technical training are combined into one integrative mechanism - technical and physical training.

The allocation of technical and physical training as a separate integrative link in the system of training activity of swimmers, in our opinion, is also logical due to the fact that the calendar plans of sports events are quite saturated, which forces coaches to artificially reduce the share of technical training by increasing physical training. Therefore, the allocation of technical and physical training, as a separate component of the training activity of swimmers, has a number of advantages: firstly, the conjugation of physical and technical training means allows you to find the so-called bifurcation points, when overcoming which the athlete enters a new higher level of training, and secondly, inclusion (if necessary) in the training programs of loads that force training allows minimizing the negative impact of physical training means on the swimmers' stroke structure, thirdly, the use of synergistically coupled means in technical and physical training at each sports stage allows leaving the so-called "field for maneuver" in terms of correcting swimming technique even when using stressful elements included in training programs.

It should be noted that the conjugation of means and the selection of methods in the process of technical and physical training plays a decisive role in the formation of a sports result. This is primarily due to the fact that exercises (synergists) of strength, speed and speed-strength orientation, which have a reasonable influence on the biomechanical parameters of swimming technique, allow planning the training process without reducing the load and without changing the orientation of training programs (by reducing the physical component, increasing technical).

Conclusion. Thus, the allocation of technical and physical training as a single part of the training process due to the achievement of a synergistic systemic effect (emergence) allows us to determine a new direction in the planning, systematization and management of sports training components, which contributes to the achievement of higher sports results.

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