

## PHYSIOLOGICAL ASPECTS OF SWIMMERS' ADAPTATION DURING COMPETITION PREPARATION

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### Abstract:

In the article of the physiological aspects of adaptation to physical loads of athletes, engaged in swimming is described. The most relevant problems encountered in the way of preparation swimmers to main starts of the season are presented. The main emphasis is stressed on the importance of physiological indicators in the preparation of swimmers. The article is useful because the physiological aspects of swimmers' adaptation to physical loads, process, mechanisms of adaptation of the organism and factors affecting the results in sports activities are described.

**Key words:** adaptation, preparation of athletes, training load, swimmers, results in sporting activities.

### ФИЗИОЛОГИЧЕСКИЕ АСПЕКТЫ АДАПТАЦИИ ПЛОВЦОВ ПРИ ПОДГОТОВКЕ К СОРЕВНОВАНИЯМ

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#### Аннотация:

В статье рассмотрены физиологические аспекты адаптации к физическим нагрузкам спортсменов, занимающихся плаванием. Представлены наиболее актуальные проблемы, встречающиеся на пути подготовки пловцов к главным стартам сезона. Основной акцент делается на важности физиологических показателей при подготовке пловцов. В статье раскрыты физиологические аспекты адаптации пловцов к физическим нагрузкам, представлены процесс, механизмы адаптации организма и факторы, влияющие на результаты в спортивной деятельности.

**Ключевые слова:** адаптация, подготовка спортсменов, тренировочные нагрузки, пловцы, результаты в спортивной деятельности.

### INTRODUCTION

In modern sports with "emotional stress" [1] and extreme training loads the question of adaptation during physical activity is a relevant. With increasing physical activity, the adaptation of young swimmers involves a direct improvement of physical performance and speed recovery of physiological parameters of an organism after strenuous workouts [2]. It is impossible, especially for young athletes to achieve high results, without causing harm to the health, not well-balanced control over the functional preparation of a teenager's organism. Thus, it becomes very urgent to study the peculiarities of swimmers' adaptation in preparation for competition in swimming.

The problem of the research is weakly studied aspects of physiological adaptation in the process of preparing swimmers to competitive activity in which the results will be more successful.

The goal of the research is to ascertain physiological aspects of swimmers' adaptation during competition preparation. Research method is theoretical analysis of methodological literature in regards to the research problem.

Currently in the high performance sport quick changes of an organism, in other words, adaptation to the training loads and environmental factors plays a very important role in achieving high results. Each sport has specific peculiarities of preparation, in connection with it. In cyclic kinds of sports, especially at sprint distances, where the results of the prize-winners and the winners differ at hundredths fractions of seconds. It is very important to bring an athlete to the competitions in a top athletic form. During the competition in the sprint distances athletes can evaluate their surroundings and focus on the rivals, however in swimming it is much more difficult to do it, be-

cause when getting into the aquatic environment activity functions of visual and auditory sensory systems is deteriorating, as well as the range of location paths makes it impossible to control speed to swim distance rivals.

To achieve success, leading coaches use advanced training methods, which are closely interrelated general and special physical, technical and functional training. In swimming, as in other cyclic sports, the main goal is to achieve the highest speed to overcome distance and holding it on everything starting interval.

For growth of sport performance, an athlete should always get loads of a certain intensity that sports uniforms would be the most appropriate and if you cross that line, then in the organism of an athlete prerequisites appear for transition into a state of overtraining. To avoid this, a coach needs to be very clear to vary the volume and intensity of training loads with consideration of the training microcycles and individual characteristics of an athlete.

At the basis of the maintenance of the sports form and growth of sports results such phenomenon as adaptation of an organism to training loads lies. But an organism of the swimmers also adapts in addition to training loads as well to the specific conditions of water environment. Staying in the aquatic environment already renders on an organism a significant functional load [3]. Motor activity of swimmers is carried in the horizontal position of the body, overcoming great resistance of water; the work includes mainly the muscles of the arms and shoulder girdle (70%) and legs – at swimming breaststroke, performing dynamic work [4].

Under the influence of training in an organism of an athlete various morphological and functional changes, which define the sport of fitness, undergo. There are usually associated primarily with adaptive rearrangements of biological nature, reflecting the possibility of different functional systems and mechanisms [5]. During swimming such changes as bradycardia, a moderate increase in arterial pressure, a strengthening of the venous inflow to heart, increase of stroke and minute volumes of blood, an expansion of the cavities of the heart occur. In addition, there is development of respiratory muscles, in con-

nection with that when breathing the swimmers must overcome the resistance of the water.

Swimmers decrease the duration of the respiratory cycle, increasing the frequency and respiratory minute volume. During swimming blood, changes are characterized by increased content of leukocytes, erythrocytes and hemoglobin. Swimmers' sweating is almost absent, so the products of metabolism are excreted only through the kidneys, which impose additional requirements to their functions. In urine protein and red blood cells often appear because of violations of capillary permeability in the kidney. Change in the activity of the kidneys is one of the specific reactions of the organism to swim [4].

The conditions of sports activity belong to the objective factors, affecting the quality of adaptation of athletes to competitions. Currently there is no generally accepted classification of the objective conditions of competitive activity, as they vary considerably in different sports [6].

In the process of adaptation, an organism adapts constantly to changing environmental conditions, in order to preserve homeostasis. To increase the reserve possibilities the organism's functional system must move to a new level due to the functional redundancy, which occurs because of the load. A strong enough and repetitive in duration and intensity load is required to achieve effective adaptation to it. If the load is too large, it will lead to infringement of functions, and a little one will not change the condition. Small physical activity is not considered to be effective, as it does not stimulate the development of trained functions. To achieve the effect of training sessions a load is needed, exceeded the limited value. However if one crosses this line, a state of overtraining will develop. The last can lead to the disruption of adaptation [7].

Mechanisms of physiological adaptation is a complex, multilevel process, which affect most diverse functional systems of an organism. By action on the human organism of various extreme factors, the increased resistance to one particular environmental factor, which to increasing resistance to other leads influences, is manufactured.

Training loads play a role of the stimulus, whereby adaptive changes in the organism of sportsmen are activated. Adaptation in organism hap-

pens constantly: in each period of the time, the organism has reserve opportunities to answer external influences and move to a new functional level, but the size of a reserve depends on the absolute level of reorganizations of an organism on which it is. Overly prolonged load can lead to depletion of the sympathoadrenal system, which will result in a failure to adapt. [7].

As it already discussed above in aqueous environment a significant functional load influences on an organism of a swimmer. When getting into the aquatic environment at the beginning of training during the start or competitive activity the organism mechanisms are included providing preservation of temperature homeostasis; irritation of the tactile, proprioceptive and vestibular receptors occurs; the activity of different organs and systems functions in the same way as in a state of weightlessness; when being under water features of visual and auditory sensory systems deteriorate significantly [3].

To achieve maximum results, during the training process it is necessary to pay attention to the changes that take place besides impact of the training load, because in an organism mechanisms of adaptation to any internal and external influences occur. In addition, the human organism is arranged in a way that during the growth one physical qualities, other figures are reduced, with an increase in one physiological indicators – the others reduce, and therefore to develop it is impossible to the maximum limit of all the indicators of fitness. So in the work “Physiological Basis of Training of Qualified Sportsmen” Pavlov S.E. writes that to achieve results it is necessary to choose policy, means and methods of sports training, which will provide the growth of special trained athletes. A coach needs to select them based on the specifics of sporting activities and relying on the knowledge of the laws of adaptation and development of the human on organism [8].

The use of laws of systemic physiology in addressing to many challenges, which face with sports psychologists, educators and doctors may allow almost a jewelry management of the training process, the recovery processes after training and competitive loads, improve athletic performance, that ultimately, will inevitably, lead to the

achievement by any athlete the maximum possible for his sport results. Moreover, only the widest use in sports pedagogy of the laws of the system adaptation of the organism opens the ways for creation of highly effective technologies training of qualified athletes [8].

We would like to note, that one of the most important theoretical bases of sports is the doctrine of man's adaptation to physical loads, because in the foundations of the solution of specific biomedical and sports-pedagogical tasks are laid, that are related to preservation of health and possibility to increase of working capacity in the process of systematic physical load. Adaptation should be considered as a physiological basis of fitness. To date there is a number of promising provisions, which are essential for the physiology of the sport: a quantitative criteria of body functions for the different stages of adaptation to establish; the parameters of the functional state of the organism in the process of adaptation in combination with indicators of mental activity and physical performance athletes to define; significance of afferent systems in to craft new adaptive in impellent ability and skills to reveal; the versatility of the adaptation influences on the nervous system in the process of adaptation to physical loads to take into account [9].

A significant amount of work is devoted to adaptation processes in an organism. However, the mechanisms of swimmers' adaptation to loads during preparation for crucial start are not studied enough. The human organism is a reliable biological system, possessing with greatest potential adapt to the environment, including significant physical loads. To achieve good results, a fast adaptation of all body systems to training and competitive loads is needed. This is an important factor that leads to athletic performance grow [10].

Now the research of swimmers of high qualification is holding, and monitoring the dynamics of the adaptation changes in the organism of athletes in preparation for competitions is planned.

## CONCLUSIONS

The speed of the adaptation process has individual features. As a result during planning and construction of the training process trainers should

feel very clearly and precisely each athlete, look at his reaction to the load; rely on the data of physiological parameters of an organism and the

athlete's health. However rapid restructuring of the organism to loads is an important factor that leads to high sports results.

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