



Features of adaptation of sensory systems of athletes in swimming with fins

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Abstract

Objective of the study was to identify the features of the adaptation of the sensory systems of the body of athletes involved in swimming with fins.

Methods and structure of the study. The indicators of three groups were compared: those who go in for finswimming (diver swimmers), those who go in for classical swimming, and those who go in for general physical training (GPT). The age of the examined is 18-23 years. The study was conducted on a day off from training using the "Simple visual-motor reaction" technique. To carry out the statistical method, the Mann-Whitney U test was used.

Results and conclusions. As a result of the experiment, it was revealed that in the group of swimmers-submariners, the reaction rate is higher, and there is also less dispersion of results compared to the group of general physical education. Similar results were also observed when comparing the performance of the classical swimming group and the GPT group. There were no significant differences in the obtained results between the sportsmen-submariners and swimmers of classical swimming.

Based on the results obtained, it can be concluded that under the influence of many years of training, the speed of sensorimotor reactions increases both in swimmers engaged in fins and in classical swimming.

Keywords: *swimming with fins, classical swimming, speed of sensorimotor reactions.*

Introduction. In modern elite sport, all systems of the athlete's body are subjected to extremely intense loads. In water sports, including swimming with fins, high tension is required not only from the musculoskeletal and respiratory, cardiovascular systems, but also from the controlling and controlling neural mechanisms. Achieving high results in sports activities largely depends not only on the physical, but also on the psycho-physiological state of athletes [3, 4].

The problem of increasing the functionality of analyzer systems in sports and professional activities is quite relevant. This is primarily due to the fact that in sports there is a significant increase in the requirements for the speed of execution of motor acts, which occur mainly in conditions of lack of

time against the background of increased neuro-emotional stress [2, 5].

The effectiveness of many physical exercises depends on the capabilities of sensory systems. The performance of sports movements is constantly regulated with the help of feedbacks that constantly come from proprioceptors and are corrected by the nervous system and acoustic or visual information.

The constant growth of results in swimming with fins, especially at sprint distances, requires the fastest possible response to the starting signal. The results of studying the adaptation of the athletes' sensory systems will make it possible to correct the training process in order to more effectively solve the problems and challenges of elite sports.



Objective of the study was to identify the features of the adaptation of the sensory systems of the body of athletes involved in swimming with fins.

Methods and structure of the study. The experiment was conducted at the Department of Sports and Health Tourism, Sports Physiology and Medicine of the Faculty of Physical Culture of Tomsk State University. The study group consisted of 15 finswimming athletes. Control group 1 included 15 athletes involved in classical swimming. Athletes of both groups were highly qualified (Candidate Master of Sports, Master of Sports) at the age of 18-23 years old, with a sports experience of at least nine years. The training regime consisted of one to two workouts per day, five to six times a week. Control group 2 consisted of 15 students of Tomsk State University aged 18-21 years old, who are engaged in groups of general physical training (GPP). The training regime included two to three sessions per week. The studies were carried out on the day off from training.

The study used the "Simple visual-motor reaction" technique, carried out using the NS-Psychotest hardware complex (Neurosoft LLC, Ivanovo). This technique allows you to identify the typological features of the nervous system and functional state, determine the strength, balance and mobility of nervous processes, as well as the reaction rate. In addition, the speed of a simple visual-motor reaction makes it possible to evaluate the integral characteristics of the human CNS, since its implementation involves both the main human analyzer systems (visual and kinesthetic), as well as certain parts of the brain and descending nerve pathways [1].

Two parameters were investigated: the speed of sensorimotor reactions and the standard deviation, which reflects the dispersion of the results.

The choice of technique is due to the diagnostic capabilities of the methods, their safety and operator comfort, as well as the short time required for measurements.

Statistical data processing was performed using the statistical analysis package STATISTICA 12.0.

The following distribution parameters were used to describe the obtained quantitative data: Valid N (sample size), Mean (sample mean), Standard Deviation (sample standard deviation), notation $\bar{X} \pm \sigma$. To carry out the statistical method, the Mann-Whitney U test was used.

Results of the study and their discussion. An analysis of the results of a study of a simple visual-motor reaction allows us to conclude that in the group of divers, the reaction rate is higher, and there is less dispersion of results compared to the group of general physical training (GPT), based on the presence of statistically significant differences in the speed of sensorimotor reactions and standard deviation. These results indicate that the attention of divers is more stable than that of the general physical education group (Table 1).

Swimmers in classical swimming also have a higher rate of sensorimotor reactions compared to the general physical training group, based on the standard deviation (Table 2), but there are no significant differences in the dispersion of results.

Analysis of the results of the study of a simple visual-motor reaction did not reveal statistically significant differences between the groups of divers and classical swimmers.

Conclusions. The results obtained showed the presence of changes under the influence of systematic intensive training of the reaction rate to the stimulus in the direction of its increase in swimmers in comparison with the group of general physical training, as well as an increase in the stability of the nervous system in swimmers.

The absence of statistically significant differences between the groups of divers and classical swimmers allows us to conclude that sensory systems in both groups are relatively equally developed.

Table 1. Indicators of a simple visual-motor reaction in divers and general physical training groups

Index	Control group 2 ($\bar{X} \pm \sigma$)	Study group ($\bar{X} \pm \sigma$)	p
Speed of sensorimotor reactions	248,94±15,68	216,29±22,64	<0,01
Standard deviation	85,28±35,77	52,34±44,02	<0,01

Table 2. Indicators of a simple visual-motor reaction in swimmers of classical swimming and a group of general physical training

Index	Control group 2 ($\bar{X} \pm \sigma$)	Control group 1 ($\bar{X} \pm \sigma$)	p
Speed of sensorimotor reactions	248,94±15,68	219,92±24,75	p<0,01



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