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CONTROL OF MORPHOFUNCTIONAL INDICATORS OF QUALIFIED POLYATHLON ATHLETES (DISCIPLINE – TRIATHLON WITH SKI RACING) WITHIN THE PREPARATORY STAGE OF THE MACRO CYCLE

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Key words: polyathlon, triathlon with ski racing, biomedical control, morphofunctional indicators, preparatory period.

Annotation. This article presents results of studies, showing information on the morphofunctional status of polyathlon athletes, specializing in triathlon with ski racing. Dynamics of morphofunctional indicators within the preparatory period of the macro cycle were recorded. A significant increase in test results during training preparation were revealed in following indicators: strength index of the right hand, vital index, lung capacity, breath-holding tests on inhale and exhale, the Ruffier-Dickson test. Obtained data can serve as a factor of correcting the training process of qualified polyathlon athletes and be used to specify the biomedical control in polyathlon. Quantitative values of indicators of the morphofunctional status of polyathlon athletes with the Master of Sports qualification can serve as an orienting point for athletes of earlier stages of the long-term preparation.

Introduction. One of the most important elements of managing training of athletes is control [1]. A number of experts note that the specificity of competitive activity in complex types of sports, which also include polyathlon, makes requirements for not only physical fitness, but also for morphofunctional indicators, which in most cases serve as a necessary condition to achieve the highest athletic prowess [2-3].

In most studies, scientists agree upon a fact that morphofunctional characteristics are criteria of sports selection in any sports, in many types of sports it is the important factor of achieving a success of a competitive result [4-6]. That is why studying morphofunctional features in types of sports, belonging to polyathlon, is of high scientific interest. In such types of sports, which also include polyathlon, a competitive exercise consists of some components, presenting completely different types of physical loads, which requires a comprehensive training for an athlete. In the discipline “triathlon with ski racing”, there are such types, as 10 km ski racing, shooting – exercise III, with a pneumatic rifle (10 shots,

10 m, standing), pull-up on a high crossbar (for men). At the modern stage, interest of researchers to study different aspects of physical training in polyathlon is directed towards studying physical conditions of polyathlon athletes, creating and planning loads at different stages of the long-term training [7-11]. In addition, there are many publications concerning the possibility of using polyathlon elements for physical education of youth in educational institutions and the implementation of polyathlon in the "Fit for labor and defense" standards. At the same time, at the modern stage of developing training for polyathlon athletes, specialized in triathlon with ski racing, issues of controlling morphofunctional indicators of athletes are not sufficiently examined.

The purpose of this study is to examine dynamics of changes in morphofunctional indicators of qualified polyathlon athletes (sports discipline – triathlon with ski racing) within the preparatory period of the annual cycle of training.

Methods and organization. Analysis and gathering of scientific and methodological literature; anthropometry; index method; method of evaluating the functional state; mathematical statistics method. Fourteen athletes, who engage in polyathlon (triathlon with ski racing), aged 18-12 years, with the Candidate Master of Sports and Master of Sports qualifications, participated in the study. The study was carried out in the base of the Department of Natural Sciences of the Siberian State University of Physical Culture and the Sports School of the Olympic Reserve № 5 located in Omsk.

Results and discussion. At this stage of the study, several tasks were being solved: the analysis of the effectiveness of training process within the preparatory period of the annual cycle; gathering information on the morphofunctional status of qualified polyathlon athletes (triathlon with ski racing); justification of the direction of pedagogical correction of the polyathlon athletes' training process.

In order to solve the set task, a recording of morphofunctional indicators of qualified polyathlon athletes, engaged in triathlon, was made. The test was carried out at the beginning and at the end of the preparatory period.

The analysis of average indicators of body length and mass of polyathlon athletes with the Master of Sports and Candidate Master of Sports qualification indicates compliance with average values for this age (normosthenic constitution, average height). During the preparatory period, there were no significant fluctuations in body mass of examined athletes. Recording of the physical state of athletes at the beginning of the preparatory period reveals following data of morphofunctional indicators: values of the body mass index in all polyathlon athletes exceed average values of men of this age, which indicates a developed pectoral girdle and shows the specificity of this type of sports (Table 1). Strength

index of the right and left hand shows an insufficient level of development of hand strength, which contradicts requirements to strength indicators in this type of sports, where one of required exercises is the pull-up on a high crossbar. It is possible, that the main set of repeats in the pull-up takes place at the beginning of the exercise till the moment of the organism's "acidification". Values of the functional tests showed an average level of the development of the respiratory and cardiovascular systems. Low values in indicators of hypoxic tests (not higher than average age standards) and other functional indicators at the beginning of the preparatory period are possibly the result of the rest period (previous recovery period), or can indicate an insufficient level of the functional fitness of athletes in whole. In order to check it, these indicators were also recorded at the end of the preparatory period.

Table 1

Average values of indicators of the morphofunctional state of polyathlon athletes (sports discipline – triathlon with ski racing)

№	Indicators	Values	
		Beginning of the preparatory period	End of the preparatory period
1	Body length, cm	172,8±3,9	172,8±3,9
2	Body mass, kg	66,6±3,9	66,3±3,09
3	Right hand dynamometry, kg	41,2±4,2	43,9±4,6
4	Left hand dynamometry, kg	40,9±6,6	42,1±6,0
5	Strength index of the right hand, %	62±3,9	66,2±4,1*
6	Strength index of the left hand, %	61,4±3,8	63,5±3,9
7	LC, ml	4463,3±191,1	5120±272,1*
8	Vital index, ml/kg	67,02±5,4	77,2±6,1*
9	Body mass index, gr/cm	385,4±27,6	383,7±28,5
10	Breath-holding test on inhale, s	36,8±4,0	44,3±4,0*
11	Breath-holding test on exhale, s	62±7,5	72,1±4,9*
12	Ruffier-Dickson test, c.u.	3,79±0,6	2,98±0,3*

Note: LC – lung capacity; * - statistically significant changes between indicators were registered at different stages of the study, when $P<0,05$

A revealed initial level of morphofunctional indicators in polyathlon athletes allowed defining weak points of training. Therefore, training of athletes during the preparatory period was directed towards not only solving main motor tasks, but also towards implementing control of morphofunctional indicators.

A comparative analysis of morphofunctional indicators of polyathlon athletes, specialized in triathlon with ski racing, at the end of the preparatory period shows a pronounced increase in the functional fitness level, significant differences between values of the strength index of the right hand, vital index, LC, breath-holding tests on inhale and exhale, the Ruffier-Dickson test at the beginning and at the end of the preparatory period of the macro cycle (Table 1).

An increase in results of breath-holding tests shows an increase of tolerance of the respiratory system to hypoxia, which is an important component in following competitive exercises in polyathlon: ski racing and pull-ups.

Physical performance in case of repeated examination according to the Ruffier-Dickson test was highly evaluated, which characterizes a great performance of the heart and contributes to an increase of results in pull-ups on a high crossbar.

A significant growth rate of values of the vital index and LC, indicators of breath-holding tests shows a high level of the functional fitness of the respiratory system and allows judging the increase of the lung respiratory surface, as well as the speed of recovery processes after dosed physical loads.

Moreover, it is important to note that according to indicators of the hand strength there was no substantial growth rate in the examined selected group during the preparatory period. Apparently, for athletes of such qualification, hand dynamometry results have already reached appropriate values and do not serve as an informative indicator of the functional fitness in polyathlon.

Conclusion. During the study, we obtained quantitative values, characterizing the morphofunctional status of elite polyathlon athletes, specialized in triathlon with ski racing. These data can be used for implementation of the biomedical express control over the functional state of athletes with the Master of Sports and Candidate Master of Sports Qualification and serve as an orienting point at earlier stages of training in polyathlon as well. The most significant indicators of the morphofunctional status of polyathlon athletes are values of the vital index, LC, hypoxic breath-holding tests. Based on the data obtained, we can plan and implement individual corrections into the training process of polyathlon athlete during the preparatory stage of the annual cycle of training, which will include changes in parameters of training loads and the ratio of used methods within the process of implementing general and special physical training.

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