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## Sport training as the basis of high achievements in sports

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**Abstract:** The existing system of sports trainings is focused on achieving high results by athletes. The basis of such achievements is sports or physical training. However, this will happen if an athlete, under the direction of a coach, conducts the training process, observing certain methodological guidelines. They include the adequacy of physical activity loads, regularity, gradualness and waviness of the performed work, high motivation of the athlete himself and a sufficient qualification level of the coach, who is able to lead the athlete to the desired result. All this, combined with physical fitness, will have a positive influence on sports result that the athlete and his mentor try to achieve. In the training process the main attention is paid to the functional component. It should be considered as part of the entire physical training process or as one of the independent types of sports training. **The scientific novelty** of the work is in the fact that it considers the role and importance of the functional component of sports training in the training process of athletes of various ages. They train in endurance oriented sports. They will positively affect the improvement of sports results. For this purpose we recommend to use a cumulative indicator of cardiorespiratory system activity, determined during physical exercises fulfillment. The aim of the research work is to reveal the role and importance of the functional component of sports training in the training process of athletes. **Materials.** It is reasonable to monitor the state of health, physical and functional types of training among athletes of various sports and ages with the help of created by us integrated approach. It provides simultaneous registration of basic physiological indicators. **Research methods.** We used non-invasive research methods. They include the following: recording Kubichek diffrrheogram (1974), external respiration indices registration as a reaction to the load at a bicycle ergometer. **Results.** We offered the indicator for assessing the functional state of the athletes' body, the advantages of which are the following: complexity, the possibility of calculation using non-invasive research methods and ease of use in practical work. **Conclusion.** Thus, functional training is not only the part of an independent type of sports training, but it also plays an integral role, since other types of athlete training depend on its role.

**Keywords:** sports training, non-invasive research methods, physical load, athlete, training process.

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### Introduction

The existing system of sports trainings is focused on achieving high results by athletes. The basis of such achievements is sports or physical training. However, this will happen if an athlete, under the direction of a coach, conducts the training process, observing certain methodological guidelines. They include the adequacy of physical activity loads, regularity, gradualness and waviness of the

performed work, high motivation of the athlete himself and a sufficient qualification level of the coach. He is able to lead the athlete to the desired result [2, 7, 8]. All this, combined with physical fitness, will have a positive influence on sports result that the athlete and his mentor try to achieve.

Sports or physical training is a long-term and varied process. It is directed toward physical qualities, functional systems abilities and

mechanisms development. They provide high level of their demonstration [5]. The result of this process is physical readiness. It is seen in the level of physical qualities development, necessary for an effective training and competitive activity, the abilities of different functional systems. They provide this level, especially if it concerns competitions, where all physiological systems of an organism work at their maximum functional output. That is why the main attention in the training process is paid to the functional part. It should be considered as the part of all physical training or should be considered as an independent kind of sport training [3].

The aim of the research is to reveal the role and the significance of functional part of sports training in the training process of athletes.

### **Materials and methods**

It is reasonable to monitor the state of health, physical and functional types of training among athletes of various sports and ages with the help of created by us integrated approach. It provides simultaneous registration of basic physiological indicators using non-invasive research methods as the reaction to the physical load [3]. Aggregative index was defined in the groups of 15-16 year-old teen-agers, 17-21 year-old boys, 22-35 and 36-60 year-old athletes. They trained in endurance oriented kinds of sport. We revealed the following cardiorespiratory system indices among these age groups of athletes: heart rate (HR), stroke volume (SV), respiratory minute volume (RMV), coefficient of oxygen consumption (CO<sub>2</sub>C).

### **Results and discussion**

For sport results increase it is necessary to pay attention to all kinds of training, as sportsmanship reserves are in a creative approach of a coach and an athlete to their realization. It is necessary to be in constant contact with scientists. They search for more rational methods and ways of an athlete's fitness improvement, consider the questions connected with their physical and functional state control. The stress in the activity of a coach and an athlete should be on inner reserves of a person,

who trains, which would provide sportsmanship improvement.

During selection into different kinds of sport it is necessary to pay attention to health state of an athlete-beginner and the next stage of selection stage would be tests [4, 6]. They would help to make the conclusion concerning the expediency of being involved into this or that kind of sport.

The most important kind of sports training, especially at the initial stage of a long-term training, is general physical training. The meaning of which is in physical qualities development and improvement and in preparation for further sports activity. In any kind of sport the set of physical qualities forms the base for sports results achievement. The stress on physical qualities development (general physical training) would decrease with the increase of sportsmanship. Each year priority would be given to special physical training, directed toward an athlete's special qualities development for a chosen kind of sport. For this purpose it is necessary to reveal special qualities and then develop them and improve [1].

It is reasonable to consider functional training as an independent unit of sports training, directed toward the functions of an organism development and improvement. At the same time, functional readiness is the state of an organism. It reflects the level of development and the ability to realize physiological, biochemical, psychological reserves achieved during the process of training. They provide effective activity during the competitions. It means that it is achieved as a result of the training process and is realized during competitions and reflects the level of organism reserves. For quantification of the reserves we revealed the difference between maximum possible level and the level typical for rest. Apart from the used reserves, functional readiness is a high level of physical qualities and abilities development, significant for the definite kind of sport.

Thus, functional training fulfills the role of an integral training. The meaning of it is in all kinds of sports training combination and its influence on different kinds of training.



Fig. Schematic presentation of the connection between the kinds of sports training, directed toward the final result by means of motor qualities and functional abilities of an organism development

Functional training depends on the functional state. It is defined according to objective criteria. These criteria include physiological indices, the parameters of cardiorespiratory system, including the indices of cardiovascular system, such as heart rate (HR), arterial blood pressure (ABP), systolic pressure (SP), diastolic pressure (DP), pulse pressure (PP), stroke volume (SV), minute blood volume (MBV); respiratory system indices: respiration rate (RR), breathing capacity (BC), respiratory minute volume (RMV), vital capacity (VC), birth-death ratio (BDR), coefficient of oxygen consumption (CO<sub>2</sub>C), arterio-venous difference in oxygen (AVD O<sub>2</sub>); physical working capacity indices: physical working capacity in terms of heart rate 170 beats/min (PWC<sub>170</sub>), relative physical working capacity in terms of heart rate 170 beats/min (PWC<sub>170</sub> / P).

There is a physiological limit of endurance for an organism of an athlete. He trains in cyclic kinds of sport, in terms of the fulfilled physical load. If we exceed the limits, this load would be harmful for a person's health state. Such loads are considered maximal and their influence on a person's organism

would not always provide its development. In some cases during the training process in the separate kinds of sport their influence can provide functional abilities widening, as the complexes of adaptive reactions are formed. They provide adaptation to the demands of competitive activity of the definite kind of sport. For example, interval training or a micro cycle, which models the competition.

On the basis of studying the existing scientific information sources, the results analysis of cardiorespiratory system study we offered the index of athletes' organism functional state assessment, the advantages of which are the following: complexity, the possibility of calculation using non-invasive research methods and ease of use in practical work [1, 2, 3]. We came to the conclusion that such kind of parameters include total index of cardiorespiratory system activity, which is calculated according to the following formula:  $SV * CO_2C / HR * RMV$ . The results of total index of cardiorespiratory system activity are presented in the table.

Table

Total index of cardiorespiratory system activity, revealed during the increasing power load fulfillment in the groups of teen-agers (1), boys (2) and athletes-adults (3,4)

Load	Groups of athletes			
	1	2	3	4
Initial state	178,36±30,75	303,33±23,53 <sup>+</sup>	376,83±51,34 <sup>*</sup>	283,21±21,83 <sup>v</sup>
50 W	92,00±11,57	180,51±10,66 <sup>+</sup>	210,48±13,59 <sup>*</sup>	141,97±7,93 <sup>vx*</sup>
100 W	55,01±7,13	134,12±7,14 <sup>+</sup>	159,42±12,06 <sup>*</sup>	116,24±5,71 <sup>**</sup>
150 W	40,11±6,24	96,15±5,26 <sup>+</sup>	114,15±10,06 <sup>*</sup>	76,60±5,45 <sup>vx*</sup>
200 W	25,56±3,02	69,63±4,53 <sup>+</sup>	82,99±5,63 <sup>*</sup>	49,35±4,45 <sup>vx*</sup>

Notes. + – statistical validity of differences between groups 1 and 2; \* – statistical validity of differences between groups 1 and 3; v – statistical validity of differences between groups 1 and 4; x – statistical validity of differences between groups 2 and 4; \* – statistical validity of differences between groups 3 and 4

### Conclusion

Thus, functional training is not only the part of an independent type of sports training, but it also plays an integral role, since other types of athlete training depend on its role (picture). That is why its significance increases with the increase of experience. It concerns not only cyclic, but other kinds of sport.

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