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# PHYSIOTHERAPY AS A MEANS OF IMPROVING THE PHYSICAL AND FUNCTIONAL PERFORMANCE OF YOUNG TRIATHLETES

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## ABSTRACT

The article deals with the problem of finding methods of restorative means that increase the body's performance and search for integral characteristics of the effectiveness of adaptation of the athlete's body to high volume and intensity of training and competitive loads.

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**Relevance of the research.** In recent years, the state policy of the Republic of Uzbekistan has given priority to promoting physical culture and various sports, promoting a healthy lifestyle among the population, and ensuring the country's worthy performance in the international sports arena. This is confirmed by a Decree of the President of the Republic of Uzbekistan "On measures for further development of physical culture and sports" dated 3 June 2017 presidential decree of the Republic of Uzbekistan № 2821, dated March 9 2017 year, "About preparation of athletes of Uzbekistan to the XXXII summer Olympic and the XVI Paralympic games in 2020 in Tokyo (Japan)", the decree of the President of the Republic of Uzbekistan from 24.01.2020 year "On measures on further improvement and promotion of physical culture and sport of the Republic of Uzbekistan», previously published resolution of the Cabinet of Ministers of the Republic of Uzbekistan from 13.02.2019 year "On approval of the national concept for the development of physical culture and sports of the Republic of Uzbekistan for the period 2019-2023 of the years", at the moment approved the draft of a legal document Cabinet of Ministers of the Republic of Uzbekistan from 2019 year "On measures for further development of triathlon in the Republic of Uzbekistan". In our opinion, these legal acts are evidence of the Republic's leadership's concern for the health and physical development of the country's population, as well as they provide an opportunity for people of all ages to engage in their chosen sport, thereby ensuring mass participation in physical culture and sports (1, 2).

The development and popularization of triathlon in Uzbekistan is one of the significant factors that stimulate the interest of the General population in this sport. Nowadays, the significance of triathlon is rapidly increasing as a sport that is a multi-sport race, consisting of continuous sequential passage of its participants through three stages, each of which comes from an independent cyclical sport.

Regular triathlon classes help reduce the risk of heart disease, prevent diabetes, strengthen the muscle corset, develop coordination abilities and vestibular apparatus, increase the body's immune system and increase the life expectancy of those involved.

But it should be remembered that high-performance sports have specific requirements for the physical fitness of athletes, functional capabilities and physique. Therefore, there are certain

differences in the content and methods of physical training in a particular sport, for athletes of different ages and qualifications. In the course of the above, the issues of methodology for testing individual components of functional and physical fitness of a triathlete, evaluating their interaction and searching for integral characteristics of the effectiveness of adaptation of the athlete's body to large and near-limit training and competitive loads become particularly relevant. Also of interest are the issues of methods of restorative means that increase the body's performance and search for integral characteristics of the effectiveness of adaptation of the triathlete's body to high volume and intensity training and competitive loads (4, 5, 7).

In recent years, the following types of physiotherapy have become widely used in sports and health practice: massage, acupuncture, vibration stimulation, electrical stimulation, laser, magnetic and magneto-laser stimulation, and others (6, 7).

In order to achieve stimulating effects for those engaged in physical culture and sports, we studied the results of studies by Osipova N.V., Antipova T.K., Balabokhina T.V., Brook T.M., Titov V.A., which revealed the most pronounced response of the cell in restoring its functions under the influence of NIMLI, which is a combined version of exposure to magnetic and laser radiation, that is, low-intensity magneto-laser radiation (LIMLR) (5, 7).

**The aim of the research.** To determine the influence of LIMLR on the functional capabilities and physical indicators of young triathletes who are members of the national team of the Republic of Uzbekistan.

**The task of the research.** 1) Analyze physiotherapy tools and methods for restoring the body of athletes; 2) Specify the features of the use of restorative and stimulating tools and methods in the process of training triathletes at the stage of improving sports skills; 3) Determine the effectiveness of the use of magnetic laser stimulation methods on the body of young athletes.

**Organization of research.** When choosing the parameters of changes in the functional state, we took into account the work of N.V. Osipova, T.V. Balabokhina, T.M. Brook, V.A. Titov, as well as the results of our preliminary research. Based on this, the following indicators were selected: standard deviation (SDNN), variance (D), mode (Mo), mode amplitude (AMoSDNN), voltage index of regulatory systems (SI), total power of the spectrum (TP), activity indicator of regulatory systems (AIRS). Cardiointervalogram were carried out before the cycles and after cycles of magnetic-laser exposure (5, 7).

**Study results.** Changes in the functional state of young triathletes under magneto-laser exposure, in order to prevent fatigue and improve performance, are shown in table 1.

It should be noted that six of the seven parameters decreased their values by 3.28-23.68%. The increase in mod values (Mo) by 20.01 MS, or 2.08%, can be explained by the fact that the athlete's body takes a more stable level of functioning for these conditions.

Tests that reveal the level and monitoring of the overall physical fitness of young triathletes were selected as indicators of the effectiveness of the influence of LIMLR. For an objective interpretation of the results obtained, the relative changes in the test parameters of the subjects under magneto-laser stimulation of performance were considered (table 2). For the convenience of analysis and interpretation of these indicators, the levels of their changes were considered in relative form – in %.

Table 1. The parameters of the functional condition of young triathletes when the magneto-laser effect

№	Parameters	Parameter value		Parameter change	
		before the course	after the course	absolute	relative %
1	SDNN	63,31	51,04	-12,27	-18,09
2	D	3751,05	3140,70	-610,35	-16,22
3	Mo	743,24	763,25	20,01	2,08
4	AMoSDNN (%/SDNN)	37,08	33,42	-3,66	-10,14
5	SI	64,25	62,13	-2,12	-3,28
6	TP	3181,13	2601,87	-579,26	-18,68
7	AIRS	4,87	3,64	-1,23	-23,68

Table 2. Levels of relative changes (%) in the results of test indicators for monitoring physical fitness during magneto-laser stimulation of performance of young triathletes

№	Indicators	Youths	
		Control group (n=15) %	Experimental group (n=15) %
1	Running 5000 m	-11,0	-22,1
2	Running 30 m	- 7,9	-13,7
3	Long jump cm	- 1,7	0,08
4	Pulling up the torso	4,2	21,0
5	The index of physical readiness	0,13	19,5

As a result, a clear superiority of the experimental group (EG) over the control group (CG) was revealed. The most noticeable improvements were noted in the EG endurance tests (by 22.1%). The smallest shifts were observed in the speed-power test – jump from a place (by 0.08%). Significant ranges of differences were found in strength tests (21.0%). The total indicator of physical fitness monitoring – the level of the physical readiness index (PRI), in EG athletes increased by 19.5 points, which indicates a positive effect of LIMLR on the body of young triathletes. In CG, even a decrease in PRI was noted (0.13 points).

Functional tests and tests were used to make a more objective assessment of the effectiveness of the LIMLR method. The results obtained are presented in relative form in table 3.

Table 3. Relative changes (%) in the results of functional tests and tests during magneto-laser stimulation of performance of young triathletes

№	Tests	Control group (n=15) %	Experimental group (n=15) %	Differences between CG and EG
1	Harvard step test	3,81	5,81	2,00
2	PWC <sub>170</sub>	15,26	17,48	2,22
3	Rufier functional tests	-9,52	-11,81	-2,29
4	“to failure ”	13,46	17,78	4,32

The largest differences between the groups were observed in the “to failure ” test (the maximum possible number of squats) and amounted to 4.32%. Improvements were also noted in other indicators we considered: Rufier functional tests (2.29%), the Harvard step test (2.00%), and PWC<sub>170</sub> (2.22%). These differences allowed us to note the higher capabilities of the EG subjects who underwent a course of magneto-laser stimulation.

Thus, as a result, the subjects who underwent a cycle of magneto-laser stimulation had a clearly positive effect, which was expressed in subjective feelings of good recovery by the next training day, a sharp decrease in muscle pain, improved sleep and muscle relaxation, and good tolerance of training loads. All the athletes of the experimental group completed the planned training loads in full.

**Conclusions.** The results of our research show that the use of low-intensity magneto-laser radiation (LIMLR) as a stimulating and physiotherapeutic agent is appropriate for professional sports. However, the method of using LIMLR for athletes should differ due to the specific goals of their physical activity and the tasks of solving the latter.

The effect of low-intensity magneto-laser radiation is advisable to carry out taking into account the tasks of the stages of training of the athlete, as well as taking into account the duration of the stimulating effects. At the same time, a complex solution of stimulating and therapeutic tasks is possible, in particular, immunostimulation and recovery of performance. At the same time, it is desirable to take into account that immunostimulation also has a positive effect on the functional state and physical qualities of the athlete.

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