ORIGINAL ARTICLE

Physical fitness of young Greco-Roman athletes under the restrictions of the COVID-19 pandemic

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Abstract

Background and Study Aim: The physical training of young athletes is the basis for future success in competitions. Its effectiveness depends on many factors, among which safe conditions for life support stand out. In the context of the COVID-19 pandemic, there are significant restrictions on the training of young athletes. *The aim of the study* is the physical training of young Greco-Roman wrestlers in the context of the COVID-19 pandemic.

Material and Methods: The study involved young athletes (boys, n=20, age 5-7 years, Kharkiv, Ukraine). The experimental group of initial training (n=10) consisted of young athletes of the first year of study (children's sports school). The control group (n=10) consisted of children in the first year of primary school education. The study was conducted for 12 weeks. At the beginning and at the end of the study, a final testing of the level of physical fitness of boys was carried out. Tests were used to determine strength abilities, speed-strength abilities, coordination readiness and flexibility development. The study included all students whose parents agreed to participate in the study. This study was conducted by the Declaration of Helsinki and approved by the Ethics Committee of University.

Results: Positive changes in the experimental group were observed in tests characterizing the level of development of coordination abilities. During repeated testing, the experimental group was much better oriented in space when performing three rolls. This was manifested in a reduction in the time of their implementation ($t=4.091$; $p<0.001$) and a longer balance in static conditions ($t=4.11$; $p<0.01$). In tests for the manifestation of strength and coordination abilities, there is a tendency to positive changes. However, there was no confirmation of a likely difference between pre-test and post-test ($p>0.05$). In tests for flexibility, the result remained almost unchanged and even deteriorated slightly. There were very slight positive changes in other studied indicators.

Conclusions: For the formation of basic physical fitness, it is effective to provide a greater variety of training means and to maximize the focus on the game method of training. The process of training wrestlers of this age should be directed mainly to the development of coordination abilities.

Keywords: COVID-19 pandemic, Greco-Roman style, life safety, young athletes, physical training

Introduction

Conducting training with children in primary training groups requires certain conditions to be met. Restrictions during the COVID-19 pandemic are forcing trainers to look for areas of training that take into account the interests of children and their parents and learning objectives. In this direction, there are quite a lot of studies that take into account the peculiarities of building the training process of young athletes. Denerel et al. [1] consider that prolonged stay at home during isolation is characterized by symptoms of depression, anxiety and post-traumatic stress. At the same time, it is important to understand the level of mental and physical health of young athletes [2]. All this is a serious threat to the health of young athletes [3] and an important factor influencing parental decisions regarding the participation of children in sports during the COVID-19 pandemic [4]. Obviously, coaches need to be sympathetic to the current situation and the decisions of parents. It is also necessary to make corrections in the process of training young athletes.

At the initial stage of training of young athletes, special attention is paid to physical training. Physical training is the basis for the subsequent development of the technical elements of wrestling. Researchers have different approaches to solving the problem of physical training of young athletes. Harrison et al. [5] recommend using a combination of game training and high-intensity interval training. The authors argue that this should be considered the preferred training method for increasing aerobic capacity in young athletes. Engel et al. [6]

doi:10.15561/health.2022.0203

do not recommend the use of continuous moderate or low intensity exercise to improve performance related to endurance and anaerobic performance in young athletes. The study by Merkel [7] noted the need to strike a balance between physical fitness, psychological well-being and lifelong lessons in a healthy and active lifestyle for young athletes. The author argues that this approach is paramount to success. Osipov et al. [8] attach great importance to improving the body balance of young athletes by modifying training sessions.

In general, such recommendations play an important role in building plans for the preparation of young athletes at the initial stages of training. At the same time, the restrictions of the COVID-19 pandemic are forcing coaches to make adjustments to their training plans for young athletes.

The aim of the study is the physical training of young Greco-Roman wrestlers aged 5-7 years in the context of the COVID-19 pandemic.

Material and methods

Participants

The study involved young athletes (n=20, age 5-7 years). The participants were divided into two groups: the experimental group (n=10, the boys were engaged in the Greco-Roman wrestling section for the first year) – EG; control group (n=10, students of the first grade of elementary school) – CG. Selection in the control group was carried out from among 19 students of the first grade of elementary school. Were selected 10 children, the most relevant to the research program. The participants in the experimental group and the control group had approximately the same level of physical fitness. The study included all the students whose parents agreed to participate in the study. This study was conducted by the Declaration of Helsinki and approved by the Ethics Committee of University.

Study design

The study was conducted for 12 weeks. The training programs for both groups were aimed at improving the physical fitness of boys of the same age. The experimental group was engaged in the program of the sports school of Greco-Roman wrestling of the first year of study [9]. The control group was engaged in the program of the first grade of elementary school. The training program for young wrestlers contained the predominant use of means of coordination training and the game method of training. At the beginning and at the end of the study, a final testing of the level of physical fitness of boys was carried out.

Tests were used to determine strength abilities, speed-strength abilities, coordination readiness and flexibility development. The training programs took into account the conditions of the restrictions of the COVID-19 pandemic. Under these conditions, the advantage was given to home individual lessons with the participation of the parents of the students. Mobile video communications were also used in the classes.

Statistical analysis

The Excel program was used. Indicators X, σ were determined. The significance level was taken equal to $p<0.05$.

Results

Table 1 shows the results of preliminary testing of the motor fitness of the boys of the experimental and control groups. The data show that the groups almost did not differ in terms of the level of physical fitness ($p>0.05$).

In Table 2, one can observe a significant positive trend in the experimental group in almost all the indicators studied. The greatest positive changes occurred in strength abilities. Thus, the static strength of the hand grip and arm flexor muscles in the experimental group increased significantly ($t=6.02$; $p<0.001$) and the dynamic strength of the arm extensor muscles ($t=5.54$; $p<0.001$), as well as the strength of the leg extensor muscles significantly increased ($t=3.91$; $p<0.01$).

Positive changes in the experimental group were observed in tests characterizing the level of development of coordination abilities. During repeated testing, the experimental group was much better oriented in space when performing three rolls. This was manifested in a reduction in the time of their implementation ($t=4.091$; $p<0.001$) and a longer balance in static conditions ($t=4.11$; $p<0.01$).

A slightly lower positive dynamics is observed in the study of the ability to maintain dynamic balance ($t=2.85$; $p<0.001$) and the ability to differentiate the spatiotemporal parameters of movements ($t=2.74$; $p<0.001$). The best results in repeated testing were observed in tests characterizing the level of flexibility development: forward bending from a sitting position ($t=4.17$; $p<0.01$); gymnastic exercise bridge ($t=2.28$; $p<0.05$).

The study of the speed-strength abilities of the experimental group did not show significant changes, although there is a tendency to improve the results ($p>0.05$).

In the control group (Table 3) there is a positive dynamics of physical fitness in the test "Bent-Arm Hang" ($t=2.67$; $p<0.05$).

In the tests for the manifestation of strength and coordination abilities, there is a tendency to positive changes. However, there was no confirmation of a likely difference between pre-test and post-test ($p>0.05$). In tests for flexibility, the result remained almost unchanged and even deteriorated slightly. There were very slight positive changes in other studied indicators.

Table 1. The level of physical fitness of boys in the experimental (n=10) and control (n=10) groups at the beginning of the study

Test's number	Tests	EG	CG	t	p
		X ± σ	X ± σ		
I	**Strength abilities**				
1	Bent-Arm Hang Test, sec.	4.3±1.3	3.6±1.4	1.1	>0.05
2	Cadence Push-Up Test, quantity of times;	7.2±2.8	6.7±2.6	0.42	>0.05
3	Standing Long Jump Test (Broad Jump), cm;	98.5±10.3	107.0±13.5	1.78	>0.05
II	**Speed-strength abilities**				
4	Eurofit Sit Up Test (for 30 sec.), quantity of times;	12.4±2.2	14.2±3.9	1.27	>0.05
5	30m Sprint Test, sec.	7.4±1.5	6.9±1.4	0.77	>0.05
III	**Coordination abilities**				
6	Flamingo Balance Test, sec.	3.8±1.5	5.1±1.9	1.69	>0.05
7	Dynamic balance test, разів	6.7±2.1	7.4±2.3		>0.05
8	Shuttle run 4×9 m, sec.	13.6±1.4	14.1±1.5	0.71	>0.05
9	Gymnastics Forward Roll, sec. (3 раза подряд)	5.7±1.0	6.5±1.4	1.47	>0.05
IV	**Flexibility ability**				
10	Seated Forward Bend, cm	3.5±2.2	4.0±2.3	0.50	>0.05
11	Bridge Test, cm	18.2±5.2	15.8±4.5	1.08	>0.05

EG - experimental group; CG - control group

Table 2. Dynamics of physical readiness of boys in the experimental group (n=10)

№	Tests	Beginning of the experiment	Ending of the experiment	t	p
		X ± σ	**X ± σ**		
I	**Strength abilities**				
1	Bent-Arm Hang Test, sec.	4.3±1.3	10.2±2.8	**6.02**	<**0.001**
2	Cadence Push-Up Test, quantity of times;	7.2±2.8	14.5±3.1	**5.54**	<**0.001**
3	Standing Long Jump Test (Broad Jump), cm;	98.5±10.3	116.7±10.5	**3.91**	<**0.01**
II	**Speed-strength abilities**				
4	Eurofit Sit Up Test (for 30 sec.), quantity of times;	12.4±2.2	16.8±2.7	1.07	>0.05
5	30m Sprint Test, sec.	7.4±1.5	6.7±1.3	1.12	>0.05
III	**Coordination abilities**				
6	Flamingo Balance Test, sec.	3.8±1.5	6.3±1.2	**4.11**	<**0.01**
7	Dynamic balance test, quantity of times	6.7±2.1	9.5±2.3	**2.85**	<**0.05**
8	Shuttle run 4×9 m, sec.	13.6±1.4	12.2±1.5	**2.74**	<**0.05**
9	Gymnastics Forward Roll, sec. (3 times)	5.7±1.0	3.6±0.9	**4.91**	<**0.001**
IV	**Flexibility ability**				
10	Seated Forward Bend, cm	3.5±2.2	7.9±2.5	**4.17**	<**0.01**
11	Bridge Test, cm	18.2±5.2	14.1±2.3	**2.28**	<**0.05**

Table 3. Dynamics of physical readiness of boys in the control group (n=10)

№	Tests	Beginning of the experiment	Ending of the experiment	t	p
		X ± σ	X ± σ		
I	**Strength abilities**				
1	Bent-Arm Hang Test, sec.	3.6±1.4	6.1±2.6	**2.67**	<**0.05**
2	Cadence Push-Up Test, quantity of times;	6.7±2.6	8.3±2.3	1.46	>0.05
3	Standing Long Jump Test (Broad Jump), cm;	107.0±13.5	111.4±12.1	0.77	>0.05
II	**Speed-strength abilities**				
4	Eurofit Sit Up Test (for 30 sec.), quantity of times;	14.2±3.9	14.7±3.2	0.93	>0.05
5	30m Sprint Test, sec.	6.9±1.3	6.7±1.1	0.37	>0.05
III	**Coordination abilities**				
6	Flamingo Balance Test, sec.	5.1±1.9	6.5±1.3	1.91	>0.05
7	Dynamic balance test, quantity of times	7.4±2.3	9.4±2.8	1.72	>0.05
8	Shuttle run 4×9 m	14.1±1.5	13.6±1.4	0.77	>0.05
9	Gymnastics Forward Roll, sec. (3 times)	6.5±1.4	5.9±1.1	1.07	>0.05
IV	**Flexibility ability**				
10	Seated Forward Bend, cm	4.0±2.3	4.5±1.9	0.53	>0.05
11	Bridge Test, cm	15.8±4.5	16.4±3.9	0.32	>0.05

Discussion

The results of our study provide supporting evidence that under the restrictions of the COVID-19 pandemic, it is possible to increase the physical fitness indicators of boys of 5-7 years old. These results are consistent with the assertion that the conditions of the COVID-19 pandemic require a special approach to the physical preparation of children. So, Plomer [10] recommends taking into account the consequences of the impact of coronavirus on the mental and psychological health of boys and girls in primary schools, during social isolation. Another study notes that a return to playing sports will bring numerous benefits in terms of the overall health of children [11]. The authors show the role of parents in the resumption of sports. Bosselmann et al. [12] found that more physically active children were not bored and were less afraid of COVID-19.

In Greco-Roman wrestling, the stage of initial training is very important [9, 13, 14, 15]. During this stage, it is important to lay the foundation for the subsequent successful stage of sports improvement of young wrestlers aged 5 to 7 years [9, 14].

It is known that physical training plays an important role in sportsmanship [16, 17, 18]. This is especially true for children of primary school age. In the training process of wrestlers at the initial stage of sports specialization, important attention should be paid to the formation and development of the physical condition of young athletes [9, 13, 15].

Our results are consistent with the statement of other authors [19, 20] that at the initial stage of preparation, the game method of training is of great importance. In summary, this study contributes to growing evidence that young wrestlers' fitness levels can be improved even under the constraints of the COVID-19 pandemic.

Conclusions

For the formation of basic physical fitness, it is effective to provide a greater variety of training means and to maximize the focus on the game method of training. The training of wrestlers of this age should be directed mainly to the development of coordination abilities.

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Cite this article as:
Rusanov R, Vostroknutov L, Ke S, Prusik K, Golenkova J. Physical fitness of young Greco-Roman athletes under the restrictions of the COVID-19 pandemic. *Pedagogy of Health*, 2022;1(2):48–53.
https://doi.org/10.15561/health.2022.0203

Received: 18.11.2022

Accepted: 24.12.2022; **Published**: 30.12.2022