

**SPECIAL FORCE TRAINING OF QUALIFIED CROSS-COUNTRY SKIERS
18-20 YEARS OLD IN THE PREPARATORY PERIOD**

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Purpose: improving special strength training of qualified cross-country skiers of 18-20 years old in the preparatory period of annual macrocycle.

Material and methods: the study was attended by athletes aged 18-20 years, who had training at the level of the first sports category, Candidate Master of Sports, experience of skiing 8-10 years old. The control group (n=10) conducted a training process according to the children's and youth sports school program, experimental (n=10) with the use of special exercises taking into account the style of movement and muscles involved. At the end of the stages of training with the help of special tests on inline skates and a ski simulator, a control test of the development of special strength qualities was conducted, and after the study, athletes took part in competitions with inline skates in different styles.

Results: as a result of the use of special strength training in the mode (special physical training and general physical training – 80/20 %), there was an improvement in the results of test indicators of special training by 3,33-18,09% and indicators obtained during the competition: the results in the sprint race in the classic style improved by 23,63% (t=5,67; p<0,01); sprint in skating style by 24,86% (t=8,13; p<0,01); in the 10 km classic race 9,77% (t=4,01; p<0,01); in the 10 km skating style race 6,82% (t=2,43; p<0,05).

Conclusions: continuous strength training by skiers-racers in the preparatory period made it possible to ensure control and management of the training process, despite the conditions of quarantine. Using of the proposed method, promoted more rational and productive training process of skiers-racers. The ratio of special physical training and general physical training in the preparatory period has a crucial role in the training process of qualified cross-country skiers-racers of 18-20 years old.

Keywords: cross-country skiing, distance training, strength training.

Introduction

Cross-country (XC) skiing include disciplines that vary significantly for biomechanical characteristics (classic and skating moves), energy supply regimes (sprint, races on medium and long distances), technical and tactical actions (separate / individual start race, general / mass start, skiatlon, relay, ski-cross). Therefore, there is no single approach to building power training [4, 6, 9].

Much attention to special force preparation in sport ski is due to an increase in the intensity of the training process associated with the development of skiing: complications of ski trails, the emergence of more energy-intensive moves and constantly increasing competition in international competitions [5, 6, 7, 11].

The study of many specialists in the field of sports training show that physical exercises are the main means of special force training: competitive, special-preparatory and general preparatory [4, 6, 8, 12, 13].

Increasing the efficiency of the training process in XC skiing occurs due to the rationalization of the training process aimed at increasing the efficiency of power training, individualization and selection of effective methods, the distribution of training load, balance between various means of training. These problems at the present stage of development of skiing are quite important and require special attention to specialists, trainers and athletes [10, 11].

In connection with the situation that has developed recently, associated with pandemia COVID 19, a quarantine was announced in Ukraine with a restriction of

home, so there was a need for the introduction of distance techniques for the preparation of athletes [1, 2, 6].

The problem of remote training has determined the direction of research and search for the most effective means and methods for improving special power training necessary in the implementation of competitive activities of XC skiers of 18-20 years old, which is an important issue of the theory and practice of skiing, especially during quarantine COVID 19.

Purpose of the study: Improving special strength training of qualified cross-country skiers of 18-20 years old in the preparatory period of annual macrocycle.

Material and Methods of research

The studies were conducted from april to september partly in terms of distance training and during the training duties. The studies were attended by athletes aged 18-20 years old. Athletes had preparation at the level of the first sports discharge, a candidate for the masters of sports, and were part of the team of Kharkiv region from ski racing, an experience of skiing 8-10 years old. The control group (n = 10) conducted a training process under the program for children and youth sports schools in Ukraine, experimental (n = 10) with the use of special exercises, taking into account the style of movement and muscles that take part in the work. The influence on the body of skiers of training power was clarified. Complexes, with different robot regimes (static, dynamic, state-dynamic and others). The research was conducted in distance mode (april-may) and during the training duties. Three independent special power complexes of exercises were developed: for the muscles of the lower extremities (for the classic and skating style of movement), muscles of the trunk and upper extremities. The time of each complex exercises occupied 10-15 minutes, time of rest between complexes 60-90 s. For the development of high-speed qualities, special exercises were performed with additional encumbrance, with an artificial impedance (rubber shock absorber, movement on an encumbrance system), with a resistance of the external environment (water, snow, wind, mild ground), simulation exercises, jumping exercises, work on ski simulators. Total workout time amounted to 50-60 minutes. Power complexes were performed three times a week.

In order to assess the dynamics of special power indicators, testing for vice and recorded results of participation in competitions of different movement styles.

The following methods were used in the investigated methods: analysis and generalization of scientific-methodic literature, survey, pedagogical observation, pedagogical testing, pedagogical experiment, methods of mathematical statistics.

In order to achieve the research goal, a sports training program was adjusted, individual-group remote training tasks were made up, control over their execution. During the remote training process, classes were conducted using Zoom and Meet platforms.

Results of the research

During the study, the method of special power training of skilled racers in 18 - 20 years in the preparatory period was developed. Particular attention in the experimental group at this stage was given special power preparation (Generally physical training (SPP) / Specially physical training (GPP) - 80/20%), and in the control of the same time special and general training (SPP / GPP - 50/50%). At the end of each period of preparation (April, June, September), a control testing of physical fitness of athletes of control and experimental groups of conducting tests was carried out in the first training day of the microcycle (Fig. 1 and 2).

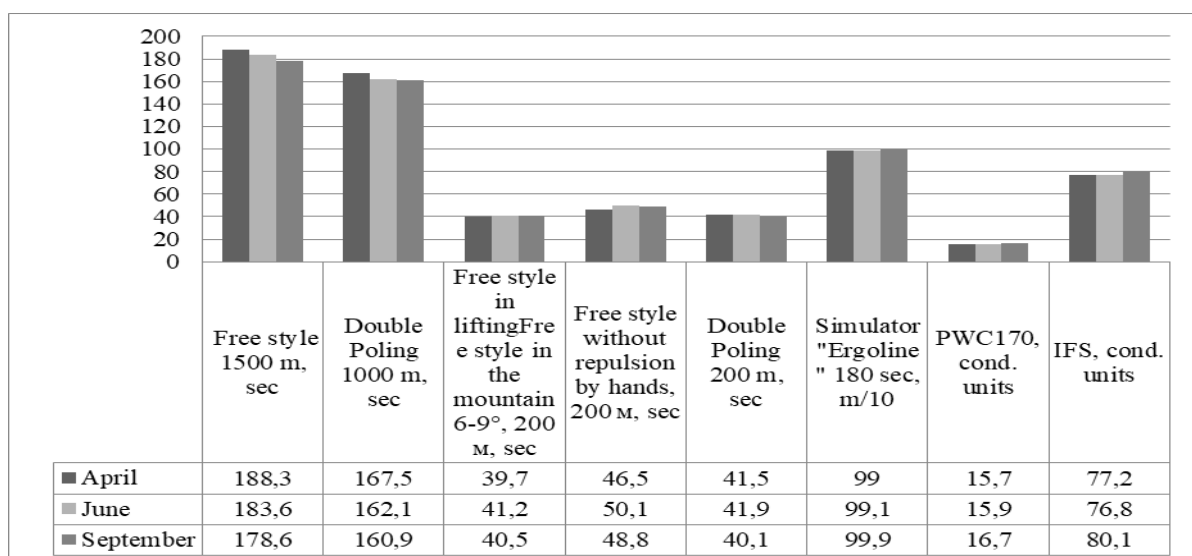


Fig. 1. Dynamics of the level of special preparedness of cross-country skiers 18-20 years of the Control group for April-June-September (means of preparation of roller skiing and simulator "Ergoline")

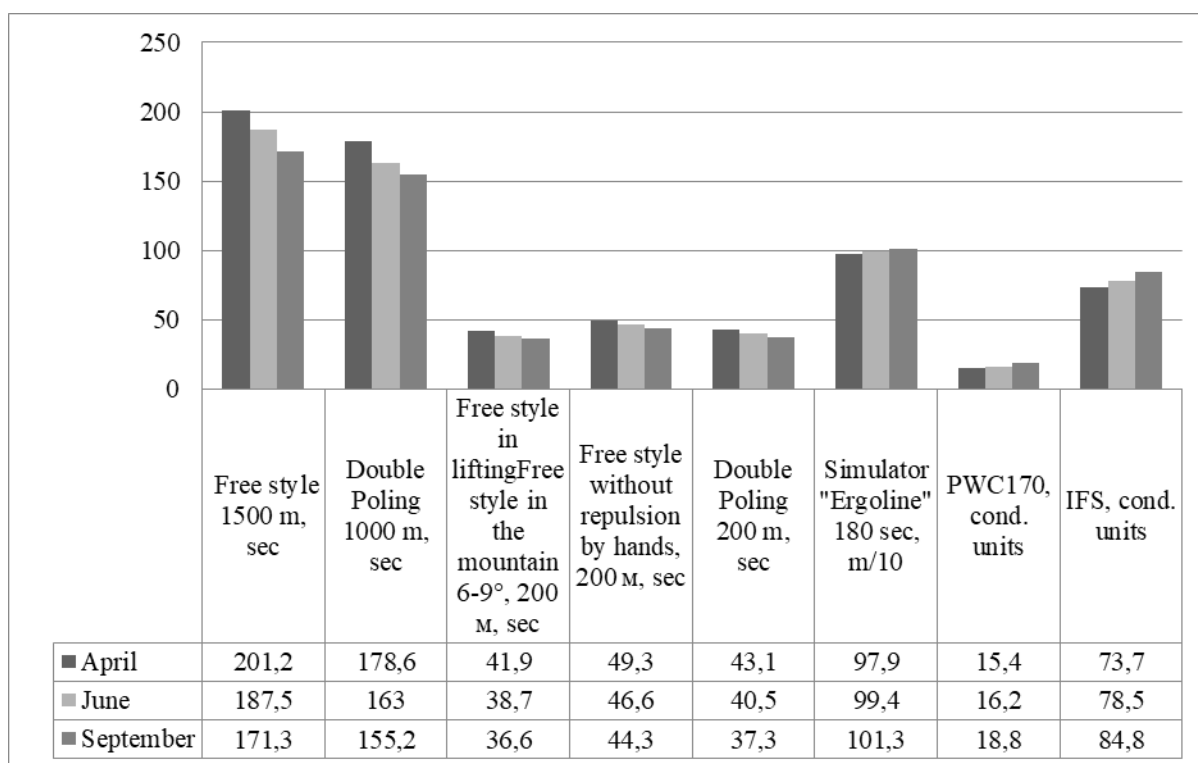


Fig. 2. Dynamics of the level of special preparedness of cross-country skiers 18-20 years of the Experimental group for April-June-September (means of preparation of roller skiing and simulator "Ergoline")

An analysis of the results of the tests showed that the indicators characterizing the special endurance of skiers on castor graders at a distance of 1500 m free style (F) in the experimental group (EG) have improved by 14.86% ($t=3,75$; $p<0,05$), and in the control group (CG) by 5,15% ($t=2,20$; $p<0,05$); at a distance of 1000 m double poling in (EG) improved by 13.10% ($t=2,47$; $p<0,05$), and in (CG) by 3,94% ($t=1,01$; $p<0,05$). In tests on the ski simulator "Ergoline" for 180 seconds in (EG) improved by 3,33% ($t=2,62$; $p<0,05$), and in (CG) by 0,89% ($t = 0,59$; $p>0,05$) (Table 1).

In the test indicators in roller skiing that characterize the speed-strengths of athletes found the following changes: the rate of overcoming the lifting Free style in (EG) improved by 12,65% ($t=0,75$; $p<0,05$), and in (CG) by 1,98% ($t=0,14$; $p<0,05$); the movement of the free style without the help of hands in (EG) improved by 10,14% ($t=0,53$; $p<0,05$), and in (CG) by 4,71% ($t=0,31$; $p<0,05$); Double poling 200 m in (EG) improved by 13.46% ($t=0,94$; $p<0,05$), and in (CG) by 3,37% ($t=0,17$ $p<0,05$) (Table 1).

Table 1

Indicators of special physical training of cross-country skiers 18-20 years at the beginning and upon completion of the study ($n_k=n_e=10$)

№	TESTS	April		September		t_{C1-C2} t_{E1-E2}	p
		CG	EG	CG	EG		
		$X_{C1} \pm m_{C1}$	$X_{E1} \pm m_{E1}$	$X_{C2} \pm m_{C2}$	$X_{E2} \pm m_{E2}$		
1	Free style 1500 m, s	188,3 \pm 3,4	201,2 \pm 7,4	178,6 \pm 2,8	171,3 \pm 3,0	2,20 3,75	> 0,05 < 0,05
2	Double Poling 1000 m, s	167,5 \pm 5,5	178,6 \pm 8,9	160,9 \pm 3,5	155,2 \pm 3,2	1,01 2,47	> 0,05 < 0,05
3	Free style in liftingFree style in the mountain 6-9°, 200 m, s	39,7 \pm 4,8	41,9 \pm 6,4	40,5 \pm 3,2	36,6 \pm 3,0	0,14 0,75	> 0,05 > 0,05
4	Free style without repulsion by hands, 200 m, s	46,5 \pm 6,3	49,3 \pm 8,8	48,8 \pm 4,0	44,3 \pm 3,3	0,31 0,53	> 0,05 > 0,05
5	Double Poling 200 m, s	41,5 \pm 7,0	43,1 \pm 5,3	40,1 \pm 4,1	37,3 \pm 3,2	0,17 0,94	> 0,05 > 0,05
6	Simulator "Ergoline" 180 s, m	989,6 \pm 12,3	978,8 \pm 11,3	998,5 \pm 8,7	1012,5 \pm 6,2	0,59 2,62	> 0,05 < 0,05
7	PWC ₁₇₀ , cond. units	15,7 \pm 2,4	15,4 \pm 2,7	16,7 \pm 1,2	18,8 \pm 1,1	0,37 1,17	> 0,05 > 0,05
8	IFS, cond. units	77,2 \pm 2,7	73,7 \pm 3,0	80,1 \pm 1,7	84,8 \pm 1,6	0,91 3,27	> 0,05 < 0,05

Note: CG - control group, EG - experimental group, IFS - Indicator of functional state

According to tests that characterize the functional state of athletes revealed the following changes: in the PWC₁₇₀ in (EG) tests have improved by 18,09% ($t=1,17$; $p<0,05$), and in (CG) by 5,99% ($t=0,37$; $p<0,05$); In the indicators the Indicator of functional state (IFS) in (EG), the results have improved by 13,09% ($t=3,27$; $p<0,05$), and in (CG) by 3,62% ($t=0,91$; $p<0,05$) (Table 1).

At the beginning of the experiment, the indicators of both groups were approximately the same. In the middle of the experiment, after the first stage of preparation, the results in both groups have changed, but upon completion of the study in the (EG), the improvement of the results occurred more ($p<0,05$), and their growth in all test indicators was 3,33 – 18,09 %.

In September, the growth of results in the (EG) was much larger than in the (CG). This is explained by the fact that at the preparatory period in all groups, the main power trained was loaded, and an additional general physical training (SPP /

GPP - 80/20%), which were performed by the interval method (Tabata) with the mode of operation 20/20, 30/30 according to specially designed complexes of power training.

In september, the athletes of both groups took part in roller skiing of sprint (prologue) and races at 10 km classical (Cl) and skate (F) styles on castorals, the results of which are presented in Table 2.

Table 2

Indicators of competitions of control and experimental groups of cross-country skiers 18-20 years after the experiment ($n_k = n_e = 10$)

№	Competition	CG	EG	t	P
		$X_C \pm m_C$	$X_E \pm m_E$		
1	Sprint classic style (CL) prolog, s	232,3 \pm 7,34	177,4 \pm 6,32	5,67	<0,01
2	Sprint skate style (F) prolog, s	179,8 \pm 4,53	135,1 \pm 3,12	8,13	<0,01
3	Classic style race (CL) 10 km, s	2275,5 \pm 36,06	2053,1 \pm 42,11	4,01	<0,01
4	Skate style race (F) 10 km, s	2010,2 \pm 46,45	1873,1 \pm 32,11	2,43	<0,05

Comparative analysis of the competitions found that athletes of the experimental group (EG) showed results during classic (Cl) and skate (F) style are much better than the skier of the control group (CG): the results in the race sprinted with classical style have improved by 23,63% ($t=5,67$; $p<0,05$); sprint skating styles by 24,86% ($t=8,13$; $p<0,05$); race classic style 10 km by 9,77% ($t=4,01$; $p<0,05$); in the race of the skating style 10 km by 6,82% ($t=2,43$; $p<0,05$) (Table 2).

During the study, it was found that special security for qualified of cross-country skiers 18-20 years old in the preparatory period under training (SPP / GPP - 80/20%), led to an improvement in special indicators of power qualities and increase the indicators of distance athletes.

Conclusions / Discussion

Distance learning exists not the first year and successfully used in various educational programs, mainly aimed at theoretical training and as an additional tool for physical or sports training, when it is possible to go outside, visit stadiums, sports sections [1; 3].

But in the mode of self-isolation, the distance learning method and sports preparation acquires a slightly different character, in connection with which there is a need to revise funds and methods of sports and physical training at home [8].

As a result of the research, it has been found that the development of special power qualities depends not only on training means, but to a greater extent from the methodology of their application: the intensity of execution (20/20, 30/30), the length of segments, the number of repetitions, recreation intervals, total time performance.

Thus, pedagogical testing of the level of strength preparedness of XC skiers allowed to file a training process in order to increase special power preparedness in the preparatory period during quarantine COVID 19.

The performed remote work allowed to provide a continuous training process of XC skiers, manage and control over training, contrary to quarantine conditions. The use of the proposed methodology for power training during quarantine has contributed to a more rational and productive training process of XC skiers-racers at the stage of self-isolation. A decisive role in the training process of skilled racers 18-20 years old has the ratio of the SPP / GPP in the preparatory period. The use of a remote form is not a reason for the future to exclude conducting eye training activities, but only acts as a form of temporary work during self-isolation. In the future, such a form of work can be used as theoretical education of athletes or as an individual work during the disease.

Prospects of further studies is to develop distance tasks of technical and tactical skill, development of equilibrium and balance of skiers-riders during self-isolation.

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