

An experimental program for physical education of rugby players at the stage of specialized basic training

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Purpose: to develop a program of general physical training of rugby players at the stage of specialized basic training and to investigate the dynamics of indicators of general physical preparedness using computer technology.

Material & Methods: study involved 60 athletes aged 16–18 years.

Results: content of the comprehensive program of general physical training of rugby athletes at the stage of specialized basic training and the results of an experimental verification of its implementation are presented.

Conclusion: in the course of the pedagogical experiment, the effectiveness of using the developed experimental program for improving the training process of rugby players of 16–18 years is proved, which is confirmed by the results of the research.

Keywords: rugby league, training process, general physical preparedness, training computer program.

Introduction

Successfully manage the process of sports training is possible only if there is a well-organized and planned system for training athletes and the team as a whole [2; 6; 7; 10; 28; 29]. Physical training as one of the components of the system of sports training, as a rule, is associated with the development of the basic physical qualities of the athlete, necessary for him in sports activities – speed, strength, coordination, endurance and flexibility, as well as some of their complex manifestations - speed-strength, speed endurance, etc. [1; 3; 15; 26].

Modern rugby league makes high demands on the motor qualities and functional capabilities of the athlete [7; 12; 14; 18; 25]. The motor activity of a rugby player is very diverse and complex. It is characterized by a great variety of motor actions, different in character and structure, the complexity of individual, group and command actions, continuous change of situations, dynamic and static operation of variable power [11; 16; 22]. All this requires a purposeful comprehensive preparation of physical and technical qualities of athletes [24; 27]. The basis for the training of rugby players is the development of the main types of physical qualities and abilities: strength, speed, speed-strength, coordination abilities, and endurance [5; 17; 19; 20; 21].

Rationally organized process of general physical training contributes to the harmonious development of various motor qualities that manifest themselves in the chosen sport and determine the success of sports activities.

High indicators of the development of general physical preparedness is the functional basis for the development of special physical qualities and other aspects of the preparedness

of athletes – technical, tactical, psychologically [4; 8; 9; 13; 23]. General and special physical training of rugby players is built with a predominance in the development of high-speed and speed-strength qualities, special and high-speed endurance for creating a high level of special functional readiness.

Thus, the means of sports training are aimed primarily at creating prerequisites for improving the qualitative and quantitative characteristics of competitive activity. This requires improving the individual athletic preparedness of athletes with an emphasis on improving speed (in all its directions), speed-strength abilities and certain types of special endurance.

The relationship of research with scientific programs, plans, themes

The research was carried out in accordance with the Consolidated Plan of Research Work of the Ministry of Education and Science, Youth and Sports for 2011–2015. On the theme 1.1 “Scientific and methodological foundations of the use of information technologies in the training of specialists in the field of physical culture and sports,” the state registration number 0111U003130.

The purpose of the research

To develop a program of general physical training of rugby players at the stage of specialized basic training and to investigate the dynamics of indicators of general physical preparedness using computer technology.

Material and Methods of the research

The experiment involved 60 rugby players who are partici-

pants of the Ukrainian Championship among boys under 18. The control group was formed from two teams (Krivoy Rog), which included 30 athletes from the teams "Rhinos" and "Miners" (14 forwards and 16 defenders). The experimental group consisted of athletes from two teams (Donetsk), which included 30 athletes from the teams of the "Tigers of Donbass" and "Typhoon" (14 forwards and 16 defenders).

Research methods: theoretical analysis and generalization of literary sources, pedagogical testing, pedagogical experiment, methods of mathematical statistics.

Results of the research and their discussion

For the study, a program of integrated general physical training for rugby players was developed. The content of the program took into account the practical experience of leading experts in rugby, analysis and synthesis of data from special literature, features of the stage of specialized basic training in rugby. Methodical approaches, technologies used to improve physical preparedness of rugby players are studied; pedagogical observations during training sessions. We used a wide arsenal and a variety of physical activities aimed not only at the development of motor qualities, but also to further improve the technical and tactical skills, which in combination provides an effective solution to the tasks of sports training.

The distinctive features of the developed program are the scientifically substantiated structure and content of the general physical training of rugby players at the stage of specialized basic training and depending on its periods, the form of organization of classes, the volume of training loads, the use of the computer program «Rugby-13», presented on the website of the Ukrainian Federation of Rugby League (www.rugby13.org.ua), during the training process [9].

The main component of the athletes training was a training plan reflecting the percentage of the orientation of the exercises on the development of basic physical qualities for the rugby player (Table 1) and the application of the computer program «Rugby-13». This program was used in the training process directly at the theoretical and training sessions. Formation of theoretical knowledge on the implementation of exercise complexes for physical training occurred both in the training process using the tablet, and when using the computer program independently.

or the development of general physical preparedness, exercises of predominantly speed-strength orientation are used.

During the formation of exercise complexes, various exercises were selected for the development of speed abilities, in particular, running for short distances (in anaerobic alacate and anaerobic glycolytic energy supply zones). For the development of strength abilities and strength endurance, various exercises were used for push-up and with weights (barbells, dumbbells, simulators). These exercises were used in a dynamic mode with an emphasis on overcoming the nature of the work of the muscles and with a combination of progressive and overcoming the characters of the work of muscles, static-dynamic mode. Speed-strength abilities developed by various jumping exercises (with weights and without, the impact method), special exercises with a bar, fartlek (which in comparison with crosses are more intense and shorter in time). To develop speed-strength endurance and special endurance, special strength and jumping exercises were used (in the anaerobic energy supply zone). Stamina developed by continuous running for 30–40 min with an intensity of 140–150 heart rate (in the aerobic zone of supply).

The indicators of general physical readiness were determined using the tests presented in Table 2.

To confirm the effectiveness of the developed program, a pedagogical experiment was conducted. In this experiment, rugby players of the experimental (n=30) and control groups (n=30).

The experiment was conducted in conditions of the training process of rugby players. All training sessions for both the control and experimental groups of athletes were conducted in accordance with the curriculum for rugby for children and youth sports schools, specialized children's and youth schools of the Olympic reserve, schools of higher sportsmanship and specialized educational institutions of the sports profile (2013). The developed authoring technology was integrated into the traditional curriculum. Athletes of the experimental group were trained on the developed experimental program, which consisted in the rational planning of the percentage of training funds aimed at the development of motor qualities of rugby players, and the use of special funds for the improvement of physical preparedness of athletes who represented in a computer program «Rugby-13».

The results of the experiment show that before the experiment, the indicators of the overall physical preparedness of rugby players of different roles of the control and experimental groups did not have significant differences ($p > 0,05$). After the experiment, comparing the parameters of the experimen-

Table 1

The program of general physical preparation of the experimental group, which includes rational planning of the percentage of training facilities for the development of motor abilities of rugby players (%)

Orientation of training	Periods of preparation											
	Preparatory				Competitive				TP			
	GPS		SPS		CS							
Mounts	12	01	02	03	04	05	06	07	08	09	10	11
General endurance	30	30	30	30								20
Absolute strength	40	40	40	40								10
Strength endurance	20	20	20	20								20
Exercises with body weight	5	5	5	5								30
Flexibility exercises	5	5	5	5								20

Note. TP – transition period; GPS – general preparatory stage; SPS – special preparatory stage.

Table 2

Tests for determining the level of general physical readiness

No. i/o	Name of the test	Direction
1.	Run at 30 m from the high start, s	Speed-strength abilities
2.	Run at 60 m from high start, s	Speed abilities
3.	Run at 100 m from high start, s	Speed abilities
4.	Run at 400 m, s	Fast endurance
5.	Running 12 min, m	Speed endurance
6.	Jump in length, cm	Speed-strength abilities
7.	Triple jump from place, cm	Speed-strength abilities
8.	Jump up from space, cm	Speed-strength abilities
9.	Bending / Extending the hands from the lying position, count times	Strength endurance
10.	Tightening from the hinge, count times	Strength endurance
11.	Benchpress, kg	Absolute strength
12.	Lifting the bar on the chest, kg	Speed-strength abilities
13.	Squats with shoulder straps, kg	Absolute strength

tal and control groups, reliable differences were obtained for almost all parameters ($p < 0,001$), except pulling out of the hinge from the defenders ($p > 0,05$) (Table 3). In our opinion, in the training program of the experimental group there was a rational correlation of the volumes and intensity of training loads. In addition, the volume of training loads of general physical preparedness increased optimally, and the intensity was brought to the maximum.

Thus, the experimental data obtained by the general physical readiness of the rugby players of 16–18 years indicate the effectiveness of the influence of the implementation of the developed experimental program.

The content of the training was aimed at developing basic physical abilities. We used a wide arsenal and a variety of physical activities, specific methods aimed not only at developing motor skills, but also on improving technical skills, which together provides an effective solution to the tasks of sports training.

One of the most important criteria for assessing athletes during the training process can serve as the dynamics of their indicators of physical preparedness. The effectiveness of the management of the training process on the basis of studying the dynamics of the athletes' readiness indices provides opportunities for further improving the training system. Thus, the identification and definition of the dynamics of these indicators in the training process is an important task that will determine the motor potential and prospects of rugby players. In Fig. 1, 2 shows the dynamics of the increase in indicators of overall physical readiness (GPS).

So, there was an increase in strength endurance indicators according to the test results «bending / extending the hands from the lying position, count times»: EG (forwards) – 8,6%, CG (forwards) – 4,8%; EF (defenders) – 8,5%, CG (defenders) – 4,8%; «tightening from the hinge»: in forwards of a EG – 5,1%, CG – 1,4% and in defenders – EG – 7,5%, CG – 11,4%.

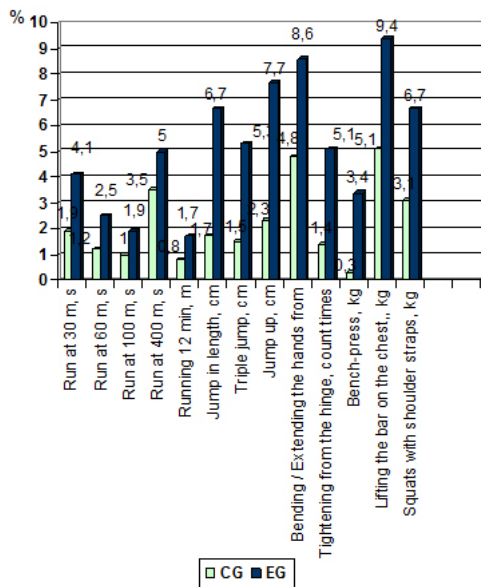


Fig. 1. Dynamics of increase in GPS indices of forwards control and experimental groups after the experiment

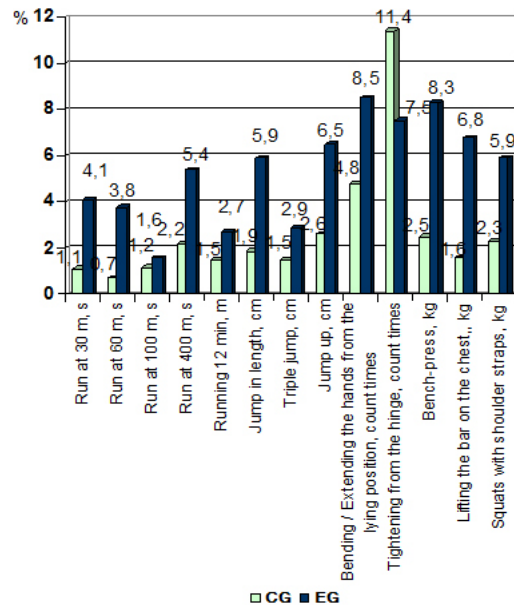


Fig. 2. Dynamics of increase in GPS indices of defenders control and experimental groups after the experiment

Table 3

Indicators of general physical preparedness of rugby players of 16–18 years of control and experimental groups before and after the experiment ($n_1=n_2=30$)

Indicators	Position	Control group	Experimental group	Stat. indicators	
		$\bar{X} \pm \sigma$	$\bar{X} \pm \sigma$	t	p
Before experiment					
Run at 30 m from the high start, s	F	4,67±0,06	4,63±0,10	1,24	>0,05
	D	4,43±0,05	4,41±0,03	1,32	>0,05
Run at 60 m from the high start, s	F	8,84±0,14	8,82±0,16	0,34	>0,05
	D	8,45±0,04	8,48±0,08	1,30	>0,05
Run at 100 m from high start, s	F	13,50±0,15	13,50±0,14	0,00	>0,05
	D	13,10±0,19	13,00±0,17	1,52	>0,05
Run at 400 m, s	F	70,00±1,47	70,00±1,41	0,00	>0,05
	D	65,00±1,26	65,00±2,00	0,00	>0,05
Running 12 min, m	F	2700,00±65,04	2703,00±60,33	0,12	>0,05
	D	2903,00±93,93	2906,00±89,21	0,09	>0,05
Jump in length, cm	F	220,50±9,49	220,40±4,99	0,03	>0,05
	D	240,10±5,92	239,90±5,23	0,10	>0,05
Triple jump from place, cm	F	679,90±11,28	683,60±9,08	0,92	>0,05
	D	718,10±10,14	720,00±10,00	0,52	>0,05
Jump up from space, cm	F	42,10±1,54	42,10±1,46	0,00	>0,05
	D	52,10±2,03	52,10±1,65	0,00	>0,05
Bending / Extending the hands from the lying position, count times	F D	50,00±3,94	50,30±3,85	0,30	>0,05
	F	7,30±0,61	7,50±0,65	0,80	>0,05
Tightening from the hinge, count times	D	9,30±0,82	9,80±0,91	1,58	>0,05
	F	79,79±3,72	80,71±3,85	0,62	>0,05
Benchpress, kg	D	71,00±4,08	73,13±3,09	1,61	>0,05
	F	86,79±4,21	86,43±6,02	0,18	>0,05
Lifting the bar on the chest, kg	D	78,75±6,71	81,25±4,65	1,19	>0,05
	F	109,64±6,34	110,00±8,09	0,13	>0,05
Squats with shoulder straps, kg	D	102,00±4,08	103,75±3,87	1,21	>0,05
	After experiment				
Run at 30 m from the high start, s	F	4,58±0,09	4,44±0,09	4,11	<0,001
	D	4,38±0,09	4,23±0,08	4,82	<0,001
Run at 60 m from the high start, s	F	8,73±0,16	8,60±0,09	2,55	<0,05
	D	8,39±0,20	8,16±0,08	4,14	<0,001
Run at 100 m from high start, s	F	13,36±0,19	13,24±0,13	1,88	<0,1
	D	12,95±0,20	12,79±0,17	2,36	<0,05
Run at 400 m, s	F	67,60±0,55	66,50±1,35	2,72	<0,05
	D	63,60±1,67	61,50±1,89	3,22	<0,01
Running 12 min, m	F	2722,00±42,07	2751,00±45,73	2,51	<0,05
	D	2946,00±47,00	2986,00±48,01	2,30	<0,05
Jump in length, cm	F	224,30±4,49	236,10±6,56	5,35	<0,001
	D	244,70±4,63	255,00±6,07	5,23	<0,001
Triple jump from place, cm	F	690,00±17,73	722,10±12,82	5,29	<0,001
	D	729,10±13,12	741,90±12,55	2,73	<0,05
Jump up from space, cm	F	43,10±0,99	45,60±0,93	6,64	<0,001
	D	53,50±1,55	55,70±1,14	4,43	<0,001
Bending / Extending the hands from the lying position, count times	F D	52,50±1,52	55,00±1,64	6,12	<0,001
	F	7,40±0,75	7,90±0,73	1,72	<0,1
Tightening from the hinge, count times	D	10,50±1,32	10,60±0,96	0,24	>0,05
	F	80,06±5,42	83,57±3,06	2,03	<0,1
Bench-press, kg	D	72,81±5,76	79,69±5,31	3,40	<0,01
	F	91,43±4,57	95,36±4,14	2,30	<0,05
Lifting the bar on the chest, kg	D	80,00±7,07	87,19±4,46	3,33	<0,01
	F	113,21±5,04	117,86±5,08	2,34	<0,05
Squats with shoulder straps, kg	D	104,38±5,74	110,31±5,16	2,98	<0,01

Note. F – forwards; D – defenders. The experiment involved 14 forwards and 16 defenders in the control and experimental groups.

A significant increase occurred in the fast endurance test results "run at 400 m": in forwards EG – 5%, CG – 3,5%; in defenders EG – 5,4%, CG – 2,2%.

Speed-strength abilities of rugby players were determined by tests "jump in length", "jump up", "triple jump", "lifting the bar on the chest", "run at 30 m" and "run at 60 m". Increase in indicators by test results "jump in length": EG (forwards) – 6,7%, CG (forwards) – 1,7%; EG (defenders) – 5,9%, CG (defenders) – 1,9%; "triple jump": EG (forwards) – 5,3%, CG (forwards) – 1,5%; EG (defenders) – 2,9%, CG (defenders) – 1,5%; "jump up": EG (forwards) – 7,7%, CG (forwards) – 2,3%; EG (defenders) – 6,5%, CG (defenders) – 2,6%; "run at 30 m": EG (forwards) – 4,1%, CG (forwards) – 1,9%; EG (defenders) – 4,1%, CG (defenders) – 1,1%; "run at 60 m": EG (forwards) – 2,5%, CG (forwards) – 1,2%; EG (defenders) – 3,8%, CG (defenders) – 0,7%; "lifting the bar on the chest": в EG (forwards) – 9,4%, CG (forwards) – 5,1%, EG (defenders) – on 6,8%, CG (defenders) – on 1,6%.

Identified changes in speed abilities, there was a percentage increase in the test results "run at 100 m": EG (forwards) – 1,9%, CG (forwards) – 1,1%; EG (defenders) – 1,6%, CG (defenders) – 1,2%.

Development of absolute strength by test results "bench-press" and "squats with shoulder straps". Increase in indicators "bench-press" observed in forwards: EG – 3,4%, CG – 0,3%, in defenders: EG – 8,3%, CG – 2,5%; from the test result "squats with shoulder straps" в EG in forwards – 6,7%, CG – 3,1 and defenders had a significant increase in indicators, both in EG – 5,9%, and in CG – 2,3%.

According to the indicators of general endurance test "run-

ning 12 min" there was an increase in forwards EG – 1,7%, CG – 0,8%; in defenders EG – 2,7%, CG – 1,5%.

Thus, there is a significant percentage increase in the rates of speed-strength abilities in the experimental group, indicating the effectiveness of the developed technology. It should be noted that the motor actions of speed-strength character is the main component in the process of playing in rugby, especially it is characteristic of Rugby League.

Conclusions

1. Studies have shown that the developed program of integrated general physical training for the development of basic physical qualities using computer technology makes it possible to increase the effectiveness of the training process in Rugby League.

2. Experimental program with the use of special tools to improve the overall physical preparedness of athletes, which are presented in the computer program «Rugby-13», positively influenced the level of development of the overall physical preparedness of rugby players.

3. The introduction of the experimental program into the training process of rugby players contributed to a significant increase in the indicators of general physical readiness ($p < 0,01$).

Prospects for further research. It is planned to study the technical preparedness of rugby players at the stage of specialized basic training using the experimental training program.

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