



## The improvement of the technical readiness of 16-18 year-old rugby players with the use of the computer program “Rugby-13”

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### Abstract

*Introduction:* The Purpose of this study was to develop and substantiate an experimental program for the improvement of the technical preparedness of 16-18 year-old rugby players through the use of computer technologies. *Materials and methods:* 60 athletes, 16-18 years old participated, in the study. *Results:* the computer training program, “Rugby-13”, was developed and theoretically based to improve the technical readiness of rugby players at the stage of specialized basic training. *Conclusions:* during the study, the efficiency of the application of the experimental program for the technical training of rugby players at the stage of specialized basic training, has been proved by the results of the research.

**Key words:** rugby-league, training process, technical training, educational computer program.

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## INTRODUCTION

The problem of training sportsmen and managing their competitive and training activities is one of the most significant problems in modern sports [1-3]. Rugby League is one of the varieties of rugby that combines the complexity of the technical elements of the game with a high intensity of physical activity during competition [4]. The achievement of maximum results in rugby league, as in most kinds of sports, is conditioned by a focused sports training [5,6].

It is known that elevated requirements of physical activity and the functional capabilities of rugby players are required. This demands the all-round development of the physical qualities and technical preparedness of rugby players, which determines the development and further improvement of the physical skills necessary in competitive activities [7].

The technique of the competitive activity of rugby players is characterized by an increased variety of physical behavior under the conditions of gaming activities, and is aimed at ensuring precise movement, while saving effort and improving the effectiveness of performance on the basis of the indicators of speed-strength qualities [5,7,8]. It has been established that players of the protective role have significantly higher rates of speed readiness. In the authors' opinion, this is due to the fact that during the game, they perform a large number of technical elements in short periods of time with much higher intensity of physical activity. At the same time, the attackers are characterized by the development of power capabilities and the implementation of a greater amount of physical activity [9,10]. Therefore, in the process of sports training, specialists are recommended to differentiate the training of players according to their game position roles.

During the last decade, scientists have applied different approaches to improving the technical gamers' preparedness of different roles [9,11]. The authors believe [12-14] that the assimilation of technology must take place against the backdrop of the gradual development of those physical qualities that promote comprehensive physical development, as well as the formation of the skills and abilities that help to develop the ability to manage movements and make appropriate decisions in gaming conditions. Consequently, the modern development of Rugby League requires more effective training aimed at the diverse physical development of sportsmen and the assimilation and improvement of the technical requirements of the game.

One of the directions for the improvement of the technical readiness of players is the use of various computer technologies that allow the management of the training process [4,15]. The authors [7,9] proposed interactive technologies, which combine multifunctional and video editing tools illustrating the performance of technical and tactical techniques by highly skilled athletes while detailing the individual elements of technical and tactical behaviors. Thus, the modernization of the training process takes place using computer programs and educational films, which form visual images of the implementation of the techniques of the players. These films support the information of the training process, which will improve the training process and increase its effectiveness. Therefore, it is relevant to search for a modern and effective method for improving the technical readiness of rugby players, which will further ensure the application of the necessary technical techniques of the game against the background of the manifestation of speed-strength abilities.

These terms and conditions determine the relevance of the research, which is related to the need to solve the cited scientific problem and has a significant theoretical and practical significance for improving the technical preparedness of rugby players at the stage of specialized basic training with the use of computer technologies.

The purpose of the research: to develop and substantiate the programme for the technical preparedness and improvement of 16-18 year-old rugby players under the guidance of computer technologies.

## MATERIALS AND METHODS

### *Participants*

The experiment was attended by 60 rugby players participating in the Ukrainian Championship for young men under the age of 18. The control and experimental groups included 30 athletes

(14 attackers and 16 defenders).

### Procedure

The study was divided into stages for rational planning. In the first stage, an analysis of scientific and methodological literature was conducted. Within the framework of the qualifying experiment, the indicators of the technical readiness of rugby players of 16-18 and members of the national team of rugby were determined. The next step was to identify the model characteristics of skilled rugby players and athletes of ages 16-18.

The program of rugby players' technical training on the basis of rational distribution of physical exercises and the use of computer training program developed the second stage. The content of the program took into account the practical experience of leading rugby specialists, an analysis and generalization of the data of special literature, the features of the stage of specialized basic training in rugby, and the study of the methodological approaches used to improve the technical skills of rugby players.

The data of the recorded experiment was designated as the basis of the experimental technology, where there were significant differences in the technical preparedness of players depending on the role of the game (table 1), as well as the model characteristics of the technical preparedness of rugby players 16-18 years.

A collection of exercises was developed to improve the technical preparedness of rugby players while taking into account their game roles, and was implemented in the annual training cycle. The determination of the percentage of training exercises took place according to the identified model characteristics of rugby players 16-18 years old. This was done in order to improve the technical preparedness of 16-18 year-old rugby players in the annual cycle, due to their game roles (table 1).

The distinctive features of the program are the scientifically substantiated structure and content of the technical preparation of rugby players at the stage of specialized basic training, and depending on the stage, the form of the organization of classes, the amount of training loads, and the usage of the computer training program "Rugby-13".

The programme of technical training included a set of exercises aimed at improving hand and foot techniques. To do this, various exercises were used to improve:

- a. transfer, catch and hit the ball (playing with hands),
- b. moving the ball in the field,
- c. changing the rhythm and direction of the flow,
- d. power martial arts for possession of the ball and its preservation (contact captures),
- e. ball strike (using both right and left legs).

The collection of exercises is presented in the database of the computer programme "Rugby-13" and presented on the website of The Ukrainian Federation of Rugby League. The computer programme combines educational videos that form a visual image of the necessary performance of rugby players for further enhancement of the training process, and also gave an opportunity to draw conclusions about the appropriateness of using the reception in one or another game situation (figure 1).

Table 1. Distribution of technical preparation means of rugby players from the experimental group during the annual cycle (%)

Periods of preparation	Preparatory				Competitive								TP
	GPS		SPS		GS								
Stages of preparation	12	01	02	03	04	05	06	07	08	09	10	11	
Months	12	01	02	03	04	05	06	07	08	09	10	11	
Hand game technique with a ball	50	50	50	50	50	50	50	50	50	50	50	60	
Foot game technique with a ball		10	10	10	10	10	10	10	10	10	10	40	
Hand game technique without a ball	25	20	20	20	20	20	20	20	20	20	20		
Foot game technique without a ball	25	20	20	20	20	20	20	20	20	20	20		

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

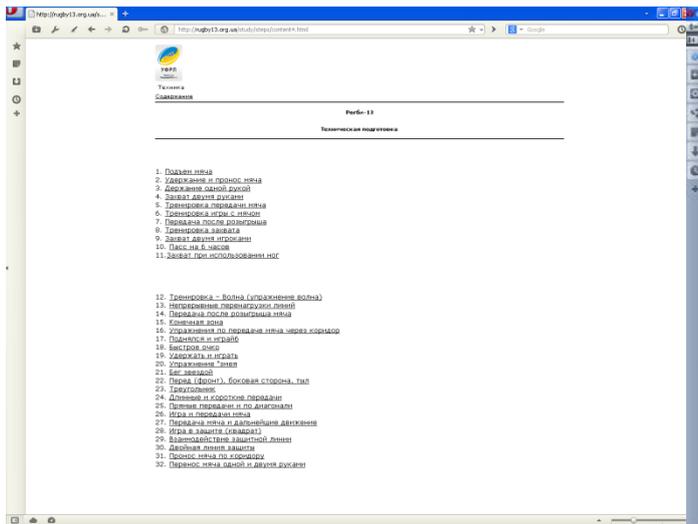


Figure 1. Work window



Figure 2. Work window (technique training)

A differentiation of sports training activities was carried out with special attention on the role of the game, which consists at a much greater intensity of the physical load of high-speed preparedness of the defenders and an increase in the volume of the physical activity of the force preparedness of the attackers. In the proposed program we used the following components of sports training: game, uniform, repeated, interval, round, combined impact, competition. The method of the comparative pedagogical experiment was used to test the effectiveness of the developed training program.

The experiment was built according to a plan, which involves the organization of two identical training groups. In the experimental group, an experimental programme of the organization of the training process was used, while in the control group, the organization of the training process was the accepted method of conducting an experiment.

### Statistical analysis

The results of the study were processed using the “Data Analysis” package of Microsoft Excel spreadsheets. Descriptive statistics (average arithmetic and standard deviation) were determined. The reliability of the differences in average values was estimated by the Student’s t-test; the withdrawal was considered to be reliable at ( $p < 0.05$ ).

## RESULTS

As a result of the pedagogical testing of 16-18 year-old rugby players, significant differences were found in the indicators of the technical fitness of athletes of different roles (table 2).

To determine the modeling characteristics of rugby players at the stage of specialized basic training, 60 players of candidates for the national team of 17-18 years old (15 attackers and 15 defenders) and 30 skilled players of 16-17 years (15 attackers and 15 defenders) were analyzed. 10 players (5 attackers and 5 defenders) of the National Team of Ukraine were selected to establish the model levels of preparedness of skilled rugby players.

The model of technical preparedness was built on the indicators of eight tests for attackers and defenders, which most informatively reflect the level of technical preparedness. The comparison of the technical readiness of 16-18 year-old rugby players with the model characteristics of players of the National Team of Ukraine is presented in percentages (%) in figure 2 and 3.

Table 2. Indicators of technical readiness of 16-18 year-old rugby players depending on a game role at the stage of the recording experiment

Indicators	Game role	average±SD
Pair hand-off for 1 minute [number of times]	A	36.68±1.25*
	D	37.97±1.62*
Tackles for 30 s [number of times]	A, D	6.75±1.06
Kick of the ball "candle" [m]	A	24.825±2.46*
	D	28.595±2.33*
Ball catching after the kick [ number of times]	A, D	7.05±1.27
Ball kicking and catching on the move [number of times]	A	6.25±1.1*
	D	6.91±0.95*
Hand kick of the ball for distance [m]	A	34.32±2.85*
	D	39.94±2.17*
"Drop-kick" [m]	A	30.85±2.22*
	D	36.75±1.65*
Shot on target [m]	A, D	35.55±3.11

SD – standard deviation, \* – exact distinction between attackers and defenders at the stage of the qualifying experiment ( $p < 0.05$ )

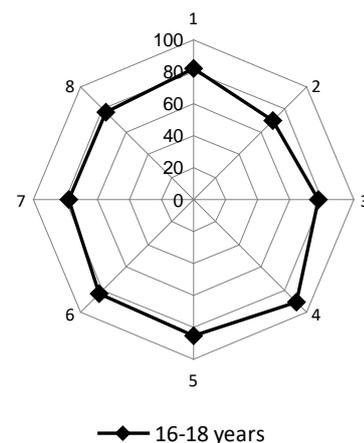
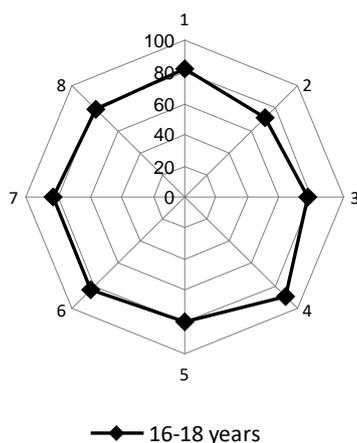


Figure 3. A comparison of indicators of technical preparedness of rugby attackers of age 16-18 with modeling characteristics of skilled rugby-attackers.

Figure 4. A comparison of indicators of the technical preparedness of rugby defenders 16-18 years old with modeling characteristics of qualified rugby-defenders

Where: 1 – pair hand-off for 1 min [number of times]; 2 – tackles for 30 sec [number of times]; 3 – kick of the ball "candle" [m]; 4 – ball catching after the kick [number of times from 10 tries]; 5 – ball kicking and catching on the move [number of times from 10 tries]; 6 – hand kick of the ball for distance [m]; 7 – "drop-kick" [m]; 8 – shot on target [m].

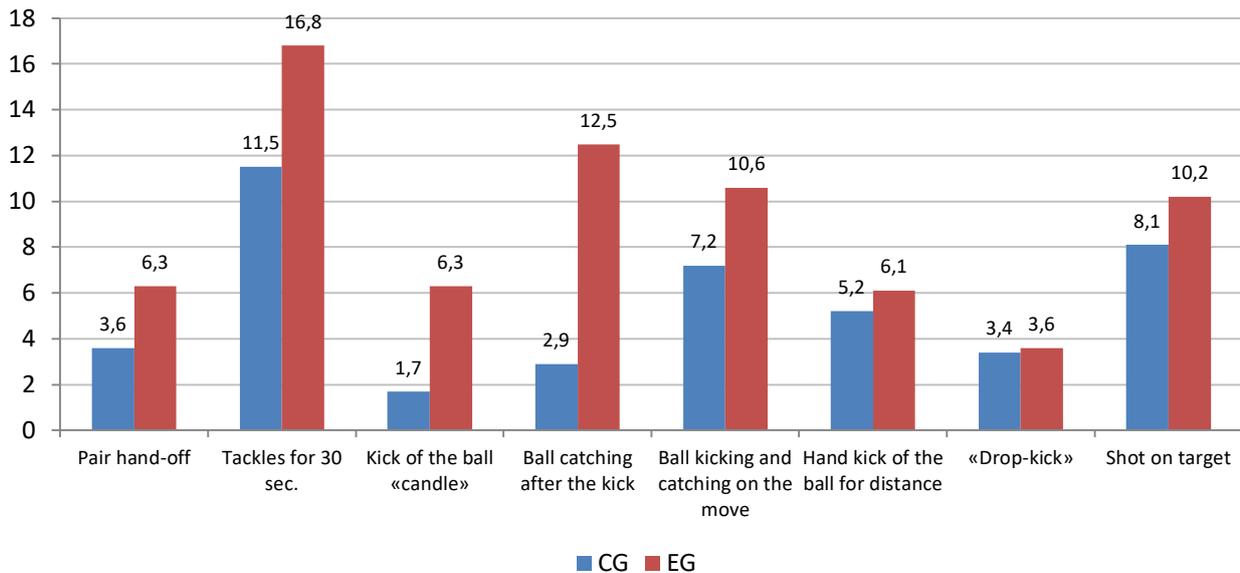


Figure 5. The technical increase dynamics of readiness indicators of rugby attackers 16-18 years old of control and experimental groups after the experiment.

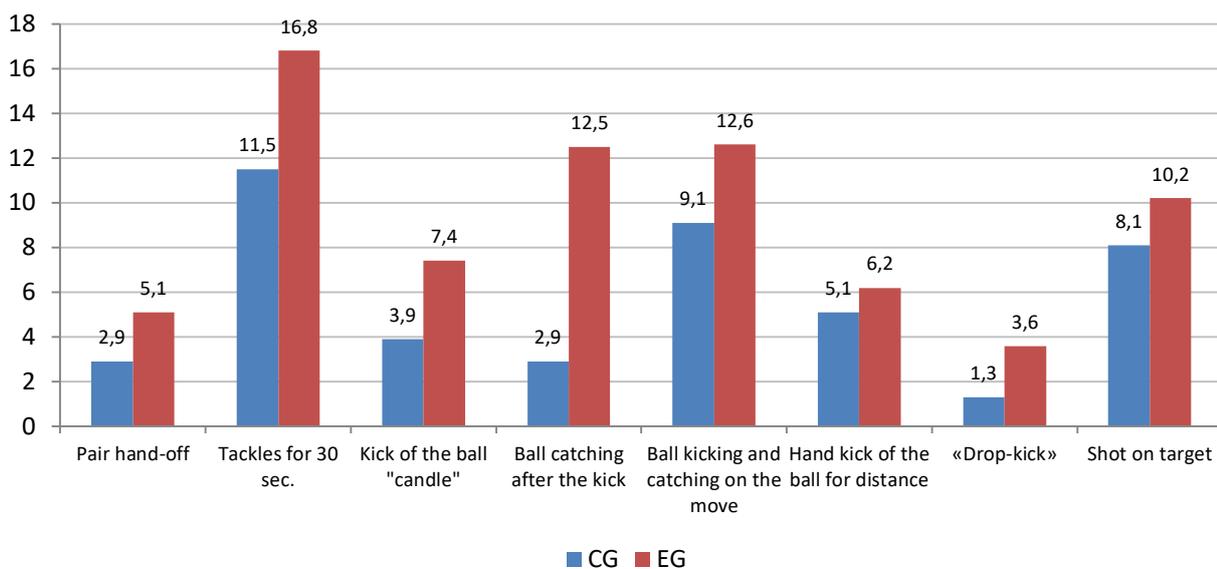


Figure 6. The technical increase dynamics of readiness indicators of 16-18 year old rugby defenders of the control and experimental groups at the conclusion of the experiment.

Significant percentage growth in all indicators of the technique of foot playing has been revealed. In the test of "Kick for distance": EG (attackers) – 6.1%, CG (attackers) – 5.2%, EG (defenders) – 6.2%, CG (defenders) – 5.1%; "Shot on target": the gain of the attackers was 10,2%, CG – 8.1%, defenders of EG – 10.2%, CG – 8.1%; Kick of the ball "candle": in the EG (attackers) – 6.3%, CG (attackers) – 1.7%, EG (defenders) – 7.4%, CG (defenders) – 3.9%.

Thus, the results of the percentage increase in the indicators of the technical readiness of 16-18 year-old rugby players indicate the superiority of the experimental group in comparison with similar indicators of athletes in the control group, which suggests the effectiveness of the experimental program of rugby players preparation and the feasibility of its introduction into the training process.

## DISCUSSION

The effectiveness of the newly designed program of technical training was confirmed in the pedagogical experiment. An analysis of the technical readiness indicators showed that there are significant differences between the indicators of the control and experimental groups in the following indices ( $p < 0.05$ ): pair hand-off and ball catching after the kick of attackers and defenders, as well as attackers in a kick of the ball «candle» and kick and ball catch.

A comparison of the indicators of control and experimental groups indicated a significant percentage increase in the indicators of technical preparedness of the experimental group. The technique of the “hands game” in test results «pair hand-off»: EG (attackers) – 6.3%, CG (defenders) – 3.6%, EG (defenders) – 5.1%, CG (defenders) – 2.9%; «ball catching after the kick»: EG (attackers) – 12.5%, CG (attackers) – 2.9%, EG (defenders) – 12.5%, CG (defenders) – 2.9%.

A study of the indicators of the dynamics of the hand and foot game revealed an increase in the indicators of the test results «tackles»: EG (attackers) – 16.8%, CG (attackers) – 11.5%, EG (defenders) – 16.8%, CG (defenders) – 11.5%; «drop-kick»: EG (attackers) – 3.6%, CG (attackers) – 3.4%, EG (defenders) – 3.6%, CG (defenders) – 1.3%; «ball kicking and catching on the move»: в EG (attackers) – 10.6%, CG (attackers) – 7.2%, EG (defenders) – 12.6%, CG (defenders) – 9.1%.

Conducted researches [16-18] found that an effective management of sports training of players can be carried out only if the definition of rational content and the construction of the training process within the annual cycle of training. Our research has been carried out in accordance with these provisions.

Authors [19,20] point to the need for rational planning and the use of technical training exercises. These assertions emphasize the relevance of our research on the rational planning of the percentage of training exercises to improve the technical preparedness of 16-18 year-old rugby players in the annual cycle. The differences in the technical readiness of sportsmen, depending on their game role that we received in our study, are also confirmed in other studies t [4, 10]. The authors emphasize the need to differentiate the training of players based on their game roles.

The necessity to take into account the models of physical, technical, tactical and psychological readiness of sportsmen for the rational planning of their training process, which was implemented in our study, is confirmed other research [3,21-25]. In other works mechanisms for attracting innovative technologies into the training process of athletes-gamers were detailed [26-28]. Our research is based on the developments of these authors and confirms their data on the effectiveness of the use of computer technology in sports training.

The authors [29-33] proved the efficiency of the application of computer technologies in the techniques training of the players’ movements. In our study, data of the improvement of technical preparedness with the use of computer technologies were supplemented and confirmed.

## CONCLUSIONS

The application of experimental computer program of technical training of rugby players led to an increase of the technical preparation of 16-18 year olds. Analysis of the results of the dynamics growth of technical readiness indicators shows that the rugby players of the experimental group had an advantage over the sportsmen of the control group in most indicators.

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