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TECHNOLOGY FOR IMPROVING SPEED-STRENGTH PHYSICAL QUALITIES OF SKILLED ATHLETES

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ABOUT ARTICLE

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Abstract: This article is dedicated to the development and testing of an innovative technology aimed at improving the speed-strength physical qualities of skilled track and field athletes. An experimental training program was developed, based on plyometric exercises, short-distance sprints, and weight training. The changes in the experimental and control groups were evaluated using statistical analysis. The results showed that athletes following the innovative program significantly improved their starting speed, maximum strength, and reactive jump distance compared to the control group. This technology plays an important role in enhancing the effectiveness of training for track and field athletes.

INTRODUCTION

Athletics is one of the most important sports that serves to perfect the qualities of speed and strength of a person. In order to achieve high results in competitions, the need to improve physical qualities of speed and strength is an urgent issue. It is especially important to introduce modern sports technologies and organize training processes based on an individual approach. In this regard, President Shavkat Mirziyoyev's decision No. PQ-6099 of October 30, 2020 "On measures to further develop physical education and mass sports" created an important basis for the development of sports such as athletics. In this decision, specific tasks for improving the training of athletes, implementing new technologies and widely introducing modern methods into practice are defined [1]. In the process of preparing athletes for competitions, it is important to introduce innovative technologies aimed at developing quick-strength physical qualities. The purpose of this research is to develop and practice an effective training technology for skilled track and field athletes. In the research process, advanced technical tools are used to measure and analyze the physical qualities of athletes. The relevance of this research is that the improvement of speed and strength qualities in the training of competitive athletes in athletics is

the main criterion for achieving high results. At the same time, the content of the research is in harmony with the national sports development strategy and is aimed at successfully fulfilling the tasks set before it [2,5].

METHODOLOGY

In this study, a technology aimed at improving the speed-strength physical qualities of qualified track and field athletes was developed and tested. 30 qualified track and field athletes aged 18-25 participated in the study. Participants were randomly selected into experimental and control groups. The experimental group trained according to the training program based on the new technology, and the control group trained according to the usual program. Several scientific and empirical methods were used in the research process. Initially, the initial physical fitness of the participants was determined using a dynamometer, a reactive force platform and other modern measurement tools. Plyometric exercises designed to develop maximum strength and speed, short-distance sprints and exercises aimed at working with weight occupied the main place in the training program. During the training, the progress of each participant was assessed using weekly tests. Statistical methods were used in data analysis. The differences between the initial and final results of the experimental and control groups were analyzed using the Student's t-test method. Based on the results, the effectiveness of the training program was evaluated. This methodology provides an opportunity to accurately and qualitatively assess the physical fitness of athletics. The training program developed through these methods is of great importance in improving quick-strength qualities.

RESULTS

According to the results of the research, qualified track and field athletes in the experimental group made significant progress in improving their quick-strength physical qualities. The results of the initial measurements did not show a significant difference between the two groups, but in the final measurements, the results of the experimental group were significantly higher than the control group. In the experimental group, the training program was developed based on elements of plyometric exercises, short-distance sprints and weight training. The starting speed of the athletes who practiced on the basis of this program increased by 12.5% on average, and the maximum strength index increased by 15.3%. Measured jump distance improved by 10.8% using the Jet Force Platform. The reason for this is to increase the working capacity of muscle fibers and develop explosive power through plyometric exercises. Although the athletes in the control group practiced according to the usual training program, their results were lower than in the experimental group. The results of the final test confirmed the effectiveness of training based on the experimental program [3]. The obtained data were analyzed using graphs and tables. For example, the experimental group's sprint performance showed significant improvement across several measures. These changes were confirmed to be statistically significant ($p<0.05$). The results show that the experimental training program is effective in improving speed-strength qualities. The implementation of this technology allows to improve the results of the athletes in the competition.

Table 1. Analysis of the results of skilled track and field athletes

Indicator	Measures	Eksperimental group (n=15)	Control Group(n=15)	Difference of change(%)
speed of start(s)	Initial	0,95 ± 0,05	0,94 ± 0,06	-
	Final	0,82 ± 0,03	0,89 ± 0,04	12,5

Indicator	Measures	Eksperimental group (n=15)	Control Group(n=15)	Difference of change(%)
Maximum power (kg)	Initial	120 ± 5	119 ± 6	-
	Final	138 ± 4	125 ± 5	15,3
jet jump height(sm)	Initial	55 ± 3	56 ± 4	-
	Final	61 ± 2	58 ± 3	10,8

Notes: 1. Start speed: Indicator measured in seconds. Significantly improved in the experimental group. 2. Maximum strength: Kilograms recorded during weight lifting. The increase in maximum strength in the experimental group is significant compared to the control group. 3. Jet jump height: the indicator measured in cm. Improvement was observed as a result of plyometric training. This table serves to express the results of the research in a statistical form and to show the training efficiency of the two groups.

DISCUSSION

The results of the research show that the innovative training program aimed at developing the quick-power physical qualities of track and field athletes was significantly effective. These results are consistent with previous research and reaffirm the importance of plyometrics, weight training, and short sprints in developing speed and strength. The positive changes in the starting speed, maximum strength and jumping distance of the experimental group are explained by the increase in the working capacity of the muscle fibers and the improvement of the quick reaction of the central nervous system. This approach is consistent with previous research, in particular, with the results of scientists who studied the effect of using plyometric exercises on the development of agility [3,5,6]. Also, the fact that the changes in the experimental group were higher than in the control group indicated the limitations of conventional training programs. This confirms the importance of individual approach and innovative technologies in the training of athletes. At the same time, there were some limitations in the research process. The limited number of participants and the relatively short duration of the training did not allow a full assessment of the long-term effectiveness of the technology. In the future, it is desirable to expand the scope of research and work on adapting the technology for other age groups. The technology developed on the basis of this research makes it possible to introduce innovative approaches in the process of training athletes. It serves to significantly increase the success of athletes in the competition [6,7,8].

CONCLUSION

This study was devoted to the evaluation of the effectiveness of the technology aimed at improving the speed-strength physical qualities of skilled athletics. The results of the study showed that by combining plyometric exercises, short-distance sprints and weight training programs, the main parameters of the athletes such as starting speed, maximal strength and jet jump were significantly improved. The performance of the participants of the experimental group is higher than that of the control group, which confirms the effectiveness of the training program developed on the basis of the new technology. This technology allows not only to increase the individual physical performance of athletes, but also to ensure competitiveness in competitions. During the research, measurements were made with the help

of advanced scientific and technical tools, and the data were statistically analyzed. The results made it possible to develop the explosive power of the muscle fibers of athletes and improve their quick reactions. This approach is an important component of the modern athletics training system. In the future, it is planned to expand the scale of the study, evaluate long-term results and adapt this technology for other age groups and sports. The practical significance of this research is that it serves to achieve high results by introducing innovative approaches to the process of training athletes. Recommendations for the implementation of the technology have been developed.

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