Original Research

The methodology of developing speed and strength abilities in boys aged 10-12 who are engaged in Greco-Roman wrestling

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Abstract

In scientific and methodological sources devoted to wrestling, much attention is paid to the problem of organizing an effective training process. However, research results often present scattered data on the individual characteristics of wrestlers and do not provide a complete picture of training in this sport. This is due to the fact that an important role in wrestling is played not by any one quality of an athlete, but by a complex of various qualities that interact with each other.

The issue of improving speed and strength qualities is widely studied in various types of martial arts. It is especially important to develop scientifically based approaches to speed and strength training of high-level athletes in modern wrestling.

This study presents the methodology we have developed for developing speed and strength qualities in young wrestlers and evaluating its effectiveness. For this purpose, tests for pedagogical testing were developed, which made it possible to evaluate the effectiveness of the methodology. Testing was conducted before and after the experiment, which lasted 8 weeks.

Pedagogical testing of speed and strength training of boys 10-12 years old engaged in Greco-Roman wrestling included the following exercises:

- standing long jump (cm);
- high jump from a standing position (cm);
- triple jump (m);
- pull-up on the crossbar in 20 seconds (number of times);
- flexion and extension of the arms in the prone position in 20 seconds (number of times);
- lifting the torso while lying on your back in 20 seconds (number of times).

Keywords: Wrestling, speed and strength training, development of physical qualities.

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Introduction

In the modern world of sports, particularly in wrestling, outstanding results are largely determined by an athlete's ability to demonstrate strength quickly and efficiently. The development of speed-strength qualities enables wrestlers to increase their activity during competitions and improve the execution of technical maneuvers, which is a decisive factor in achieving success.

One of the key objectives is to identify the most effective methods and tools for the physical training of young wrestlers. Although specialized literature on wrestling devotes significant attention to organizing an effective training process [1-10], research findings often present fragmented data on athletes' individual characteristics, without forming a comprehensive understanding of the training system in this sport.

A review of scientific and methodological literature, combined with an analysis of advanced practices, underscores the relevance of this study. While the topic of physical training has been extensively explored in sports science, the evolution of the sport and innovations in training methods create new opportunities for developing more effective approaches to enhancing wrestlers' physical qualities. This is because success in wrestling depends on a complex interplay of various interconnected athletic attributes.

Materials and Methods

The study was conducted at the Department of Physical Education within the Institute of Physical Culture, Sports, and Youth Policy at the Ural Federal University named after the First President of Russia B.N. Yeltsin (UrFU), as well as at the Municipal Budgetary Educational Institution of Additional Education "Crystal" Sports School.

An analysis of scientific and methodological literature was performed to identify the specifics of planning specialized physical training during the initial stages of the long-term training process in wrestling.

Pedagogical testing was carried out using control exercises outlined in the Federal Sports Training Standard for the sport of wrestling. These exercises included:

- Standing long jump;
- Standing high jump;
- Standing triple jump;
- Pull-ups on a horizontal bar within 20 seconds;
- Push-ups within 20 seconds;
- Sit-ups from a supine position within 20 seconds.

The pedagogical experiment involved participants from the initial training groups in their third and fourth years of training in Greco-Roman wrestling. The experimental group (n=15) underwent an 8-week training program based on a methodology we developed to enhance the speed–strength abilities of boys aged 10-12 engaged in Greco-Roman wrestling. The control group (n=15) followed a conventional training methodology.

During the study, training sessions focused on developing strength and speed-strength qualities were conducted five times per week for both the control and experimental groups. The control group trained according to the methodology outlined in the program for youth sports schools specializing in Greco-Roman wrestling. The experimental group followed an original methodology developed by the authors, based on an analysis of scientific and methodological literature.

The methodology designed for boys aged 10-12 actively incorporated the short-duration

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tension method, which included a series of specialized exercises such as push-ups, pull-ups, and squats with a partner of equal weight. These exercises were performed in sets with progressively increasing repetitions, with rest intervals of 3-5 minutes between sets. Rest periods were filled with relaxation techniques. Additional methods included exercises with medicine balls and shot puts, as well as activities requiring participants to overcome their own body weight or that of a partner. Furthermore, strength-based games and other exercises demanding both speed and strength were utilized.

The exercise system was designed to address the primary objective of enhancing movement speed and strength in specific muscle groups. This was achieved through three training focuses: speed, speed-strength, and strength.

The development of speed-strength abilities using the repeated effort method was implemented twice per week at the end of the main training session, following the practice of technical maneuvers. Each exercise consisted of 2-3 sets.

Circuit training sessions, aimed at improving physical qualities, were conducted twice per week. The number of circuits ranged from 4 to 5, depending on the selected exercises and intensity level.

The game-based method was employed during the concluding part of each training session. The games included activities such as push-and-pull contests, ball wrestling, leg-grappling struggles, gaining top position in parterre, lifting off the mat, and “third point” challenges.

To evaluate the effectiveness of the developed methodology for enhancing speed–strength abilities in boys aged 10-12 engaged in Greco-Roman wrestling, pedagogical testing was conducted. The results are presented in Tab 1.

Results and Discussion

A statistically significant improvement in standing long jump performance was observed in the experimental group, with the average result increasing by more than 25 cm. The significance of this exercise underscores its relevance in assessing the speed-strength preparedness of wrestlers, as it reflects the development of speed-strength qualities in the leg muscles, which influence movement speed and the execution of techniques in Greco-Roman wrestling. In contrast, the control group showed only a slight and statistically insignificant improvement in performance.

Similar results were observed in the standing high jump. Athletes in the experimental group significantly improved their performance by an average of 16 cm, whereas the control group’s improvement was only 6 cm.

The standing triple jump is used as a qualifying standard for enrollment in wrestling training groups and also reflects the development of speed-strength qualities in the leg muscles. Participants in the experiment, who are in their third and fourth years of initial training, find this standard particularly relevant. Before the pedagogical experiment, the results of athletes in both groups were significantly below the normative benchmark (at least 5 m). After the experiment, the performance of the experimental group improved by 1.5 m, approaching the target benchmark, while the control group’s performance improved by 0.7 m. However, no statistically significant differences were observed within the control group’s results.

In the control exercise “pull-ups on a horizontal bar in 20 seconds” a statistically significant improvement in performance was observed in both groups post-experiment.

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The control group's average improvement was 1.2 repetitions, whereas the experimental group achieved an average increase of 3 repetitions.

Following the pedagogical experiment, statistically significant differences were identified between the results of the experimental and control groups, indicating the greater effectiveness of the methodology we developed for fostering speed-strength abilities in young Greco-Roman wrestlers compared to the conventional methodology.

Specifically, in the exercise "push-ups in 20 seconds" both groups demonstrated statistically significant improvements.

However, the average performance of the experimental group post-experiment was significantly higher than that of the control group.

Table 1. Results of Pedagogical Testing of Speed-Strength preparedness in boys aged 10-12 engaged in Greco-Roman wrestling.

Exercise Group	Standing Long Jump (cm)	Standing High Jump (cm)	Standing Triple Jump (m)	Pull-Ups on a horizontal bar in 20 seconds (number of repetitions)	Push-Ups in 20 seconds (number of repetitions)	Sit-Ups from a supine position in 20 seconds (number of repetitions)	
Experimental group	Before the experiment	122,3±7,8	21,2±9,8	3,1±0,6	1,2±0,6	8,4±2,4	5,4±2,6
	After the experiment	148,6±5,7*	37,5±4,9*	4,6±0,5*	4,2±0,8*	12,2±0,8*	16,4±2,4
Control group	Before the experiment	118,9±5,9	22,4±7,6	3,2±0,8	1,4±0,8	8,0±1,4	6,4±2,2
	After the experiment	129,4±6,3	28,6±4,2	3,9±0,6	2,6±0,8*	10,2±1,2*	10,8±2,0

The final control exercise, aimed at assessing speed-strength qualities, was the sit-up from a supine position, which evaluates the capabilities of the core muscles. This exercise, along with pull-ups from a hanging position and push-ups, was performed with a 20-second time limit due to the specific energy demands of speed-strength exercises. The evaluation of the core muscles' speed-strength capabilities in athletes from both groups showed statistically significant improvements following the experiment. However, athletes in the experimental group demonstrated a significantly greater improvement in performance, with an average increase of 11 repetitions, compared to an average increase of 4 repetitions in the control group.

Conclusions

The results of the pedagogical study, utilizing the developed methodology for enhancing speed-strength qualities in young Greco-Roman wrestlers, confirming statistically significant improvements in the performance of test exercises. These exercises enabled an objective assessment of the speed-strength capabilities of the muscles in the upper and lower extremities, as well as the core muscles, of athletes in the experimental group. Overall, these findings demonstrate the effectiveness of the methodology for developing speed-

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strength abilities in boys aged 10-12 engaged in Greco-Roman wrestling.

სისწრაფისა და ძალის უნარების განვითარების მეთოდოლოგია 10-12 წლის ჭაბუკების მაგალითზე ბერძნულ-რომაულ ჭიდაობაში

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აბსტრაქტი

ჭიდაობისადმი მიძღვნილ სამეცნიერო და მეთოდოლოგიურ წყაროებში, დიდი ყურადღება ეთმობა ეფექტური სავარჯიშო პროცესის ორგანიზების პრობლემას. თუმცა, კვლევის შედეგები ხშირ შემთხვევაში ფრაგმენტულ მონაცემებს წარმოაჩენს მოჭიდავეთა ინდივიდუალური მახასიათებლების შესახებ, რაც სრულ სურათს ვერ ასახავს. აღნიშნული განპირობებულია იმითაც, რომ ჭიდაობაში მნიშვნელოვან როლს თამაშობს არა სპორტსმენის რომელიმე თვისება, არამედ ერთმანეთთან ურთიერთქმედების მქონე სხვადასხვა თვისებების კომპლექსი.

სისწრაფისა და ძალის თვისებების გაუმჯობესების საკითხი ფართოდ არის შესწავლილი საბრძოლო ხელოვნების სხვადასხვა სახეობაში. თანამედროვე ჭიდაობაშიც განსაკუთრებით მნიშვნელოვანია მაღალი დონის სპორტსმენების სისწრაფისა და ძალის ვარჯიშისადმი მეცნიერულად დასაბუთებული მიდგომების შემუშავება. ეს კვლევა წარმოადგენს ჩვენს მიერ შემუშავებულ მეთოდოლოგიას ახალგაზრდა მოჭიდავეებში სისწრაფისა და ძალის თვისებების განვითარებისა და მისი ეფექტურობის შესაფასებლად. ამ მიზნით, შემუშავდა პედაგოგიური ტესტირების ტესტები, რამაც მეთოდოლოგიის ეფექტურობის შეფასება შესაძლებელი გახადა. ტესტირება ჩატარდა ექსპერიმენტამდე და მის შემდეგ, რაც 8 კვირა გაგრძელდა.

ბერძნულ-რომაული ჭიდაობით დაკავებული 10-12 წლის ჭაბუკების სისწრაფისა და ძალის ვარჯიშის პედაგოგიური ტესტირება მოიცავდა შემდეგ სავარჯიშოებს:

- სიგრძეზე ნახტომი ადგილიდან (სმ);
- სიმაღლეზე ნახტომი ფეხზე დგომიდან (სმ);
- სამმაგი ნახტომი (მ);
- ძელზე აწევა 20 წამში (რამდენჯერმე);
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- ტორსის აწევა ზურგზე წოლის დროს 20 წამში (რამდენჯერმე).

საკვანძო სიტყვები: ჭიდაობა, სისწრაფისა და ძალის ვარჯიში, ფიზიკური თვისებების განვითარება.

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