Development of strength and speed-strength abilities in hand-to-hand combat athletes during the training stage

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Abstract

This article examines effective ways to improve the methods used for developing strength and speed–strength abilities of hand-to-hand combat athletes. Special attention is given to the optimization of training loads, the selection of appropriate exercises, and the combination of general and specialized physical preparation at different stages of training. A scientifically grounded classification of exercises aimed at improving both general and special physical fitness of hand-to-hand combat athletes has been developed. The study systematizes strength, speed–strength, and coordination exercises according to their training orientation and their transfer to competitive activity.

In addition, the article analyzes the role of functional readiness, neuromuscular adaptation, and exercise sequencing in increasing the effectiveness of training sessions. The proposed approach allows coaches to plan training more rationally, improve athletes' physical performance, and enhance competitive effectiveness in hand-to-hand combat.

Keywords: hand-to-hand combat, sports training, strength and speed-strength preparation, general and specialized physical preparation, training process.

Introduction

Currently, a specific trend in the development of modern sports, according to many experts, is the further increase in the intensity and effectiveness of competitive struggle. Modern athletes must possess excellent technical and tactical skills, move quickly in hand-to-hand combat, make correct decisions, and implement them rapidly. In conditions of constantly intensifying strong opposition from opponents, with limited time and space, they must perform complex motor activities. Knowledge and consideration of these characteristics largely determine the specific features of training. Important issues of improving the skills and special working capacity of athletes engaged in hand-to-hand combat are of particular importance, and their solution directly depends on the choice of methodological direction in the training process, and the rational use of general physical training and special physical training methods. This is one of the important factors in improving the skills and special work capacity of athletes. The problem of developing athletes' strength qualities and rationalizing training means and methods has always been studied by scientists and sports practitioners, however, the scientific basis for strength qualities of hand-to-hand combat athletes has been somewhat overlooked by specialists (A.A. Novikov, Ch.T. Ivankova, 2019; G.S. Tumanyan). Recently, a number of aspects related to the optimal ratio of various types of loads, the sequence of their inclusion in speed-strength development training for hand-to-hand combat athletes at different skill and preparedness levels have become relevant (R.S. Salamov, F.A. Kerimov). Currently, in our Republic, the methodology for developing strength and speed-strength abilities, taking into account the age-related characteristics of body development in hand-to-hand combat athletes during long-term sports training, has not yet been fully scientifically substantiated. Therefore, among hand-to-hand combat athletes in different weight categories aged 15-17, the dynamics of this ability level have not been sufficiently observed. This, in turn, does not contribute to improving the quality of the training process and competitive activity. As a result of analyzing the above problems, the following were identified: a discrepancy between the need to develop strength and speed-strength abilities of hand-to-hand combat athletes aged 15-17 and the ineffectiveness of existing pedagogical practices; a gap between the possibility of developing strength and speed-strength abilities of hand-to-hand combat athletes in different weight categories based on individualization and differentiation of the physical education process, and the lack of adequate methodology; a disparity between the need to use a differentiated methodology for developing speed-strength preparedness of hand-to-hand combat athletes in the training process and the lack of conditions for its design. The identified contradictions, the relevance of improving the quality of competition preparation for hand-to-

hand combat athletes aged 15-17, and the need to create a sports training method for various weight categories determine the problem of our research.

The selection of adequate educational content based on the individual characteristics of hand-to-hand combat athletes undoubtedly contributes to the effectiveness of the training process. The relevance, theoretical and practical significance, and insufficient development of this problem determined the choice of research topic. It should be noted that the level of development of issues related to the methodology of training qualified athletes in strength and speed-strength qualities varies greatly across different sports. In hand-to-hand combat, the issues of methods for preparing qualified athletes aged 15-17 in various weight categories for strength and speed-strength training have not yet been resolved at the training stage.

The literature analysis reveals that sections such as the improvement of technical and tactical actions in the modern system of sports training, resistance to mixed factors in competitive activity, training methods, etc., have been the subject of several serious studies successfully implemented in sports practice.

The inability to accurately assess the current strength and speed-strength preparedness of hand-to-hand combat athletes in various weight categories at the training stage is one of the most important factors that complicates the management of the training process in wrestling.

Research objective. The aim of the research is to theoretically develop and substantiate a differentiated method of strength and speed-strength training for athletes aged 15 -17 engaged in hand-to-hand combat across various weight categories at the training stage.

Organization of the study. The developed program for enhancing general and special physical training is structured as follows. Two sets of exercises are aimed at improving the special physical training (SPT) of hand-to-hand combat athletes, and two sets of exercises are focused on improving general physical training (GPT). In the exercise complex aimed at improving GPT, the effectiveness of performing maximum repetitions with special elastic bands at each consecutive 30-second interval is demonstrated as follows: 1-2 times - turning back and imitating a partner by turning left and right; 3-4 times - simulating left-right throws with athletes facing each other; 5 times - simulating a chest throw.

In the complex of special exercises for SPT, the punch exercise is performed with a special 1 kg weight, exerting maximum force with the 1 kg weight every 2 consecutive seconds. Rest periods between practical combinations are 30 seconds, while between punches - 4-6 minutes.

In the special complex of exercises for MJT (Physical Culture and Sports), we can include an exercise of jumping with a barbell, raising the arms upwards and forwards, to be repeated 10 times.

During the execution of each exercise, perform quality throws without rest, with 5-minute rest periods between sets (three partners assist the athlete). The exercises include: once - throwing partners over the shoulder at a slow pace for 50 seconds, followed by 10 seconds at maximum speed; 2 times - throwing with catching the partner for 50 seconds, then 10 seconds at maximum speed; 3 times - throwing with a lift at a slow pace for 50 seconds, then 10 seconds at maximum speed; 4 times - throwing with preliminary catching at a slow pace for 50 seconds, then 10 seconds at maximum speed.

In the GPT special exercise complex, the following tasks are defined: - 5 pull-ups on a horizontal bar, repeated 3 times, followed by hanging on bent arms for 15 seconds;

- running on tatami - 100 m;
- throwing a partner over the shoulder - 10 times;
- "bridge" running - 5 times to the right, 5 times to the left;
- carrying a partner on the shoulder with resistance;
- half-squats with a partner on the shoulder - 10 times;
- lying on the ground, bending and extending the arms 10 times;
- lifting a partner in a "quadruped" position to chest level - 10 times;
- breaking free from a partner's grip to bend the elbow - 2-3 attempts for 10-15 seconds;
- rope climbing - performed twice from a height of 5 meters.

The study selected 18 athletes engaged in hand-to-hand combat across various weight categories, aged 15-17, at the training stage. The experiment was conducted from February 2025 to September 2025 at the sports complex of the Uzbekistan State University of Physical Education and Sports. During the experiment,

Table 1. Knowledge and skills to be acquired within the program for developing athletes' knowledge and skills on ethical and legal rules

No.	Exercise content	At the beginning of the experiment			At the end of the experiment		
		Weight category (kg)			Weight category (kg)		
		45,50,55	***60,65,70***	***80,+80***	***45,50,55***	***60,65,70***	***80, +80***
		General physical training					
1	30m sprint (sec)	4.7	4.8	5.2	4.5	4.6	5.1
2	Pull-ups on horizontal bar (number of repetitions)	16.3	15.4	11.2	18.4	17.3	13.4
3	Dips on parallel bars (number of repetitions)	31.4	29.3	17.7	34.3	32.4	19.5
4	Leg raises while hanging on wall bars (number of repetitions)	12.3	8.8	6.7	16.6	10.4	8.7
5	Rope climb without legs (sec)	8.4	9.3	12.0	7.2	8.1	10.4
6	Pull-ups on horizontal bar in 20 seconds (number of repetitions)	8.4	6.2	5.1	9.6	8.5	6.8
7	Push-ups in 20 seconds (number of repetitions)	16.7	14.6	12.3	18.3	16.2	14.9
		Special physical training					
1	Running on the "bridge" 5 times to the right, 5 times to the left (sec)	17.0	18.0	23.2	15.4	16.3	21.7
2	10 transitions to "bridge" position (sec)	23.0	25.0	28.0	19.4	22.4	26.5
3	10 throws over the shoulder	29.4	28.3	32.3	25.7	26.2	30.1
4	10 throws with a turn	31.6	30.5	38.6	27.5	28.7	36.4

the functional state and load norms of the athletes were monitored. At the beginning and end of the study, the indicators of control exercises performed by hand-to-hand combat athletes for GPT and SPT were very close to each other. This indicates the correct selection of athletes for the experimental and control groups.

Result and discussion

The study revealed the dynamics of GPT and SPT indicators during the pedagogical experiment (see Table 1). The table presents the physical fitness indicators of young hand-to-hand combat athletes aged 15-17 in various weight categories. As can be seen from the table, significant changes have occurred in both GPT and SPT indicators. The most significant changes occurred in the following indicators: for GPT, in the 30-meter run, raising the legs to the pull-up position on the horizontal bar, and climbing the rope without the help of legs; for SPT, performing the "bridge" exercise (bending) and executing 10 throws over the shoulder (Table).

Conclusion

As a result of the conducted experiment, the effectiveness of using a special methodology to improve the physical fitness of 15-17-year-old hand-to-hand combat athletes has been increased, enhancing the possibilities for athletes in this sport to achieve high results.

During the course of the research, significant changes occurred by the end of the study in both GFT (General Fitness Test) and SFT (Special Fitness Test) indicators. In the GFT 30-meter run, the difference between the beginning and end of the study was 0.1 seconds for the 40, 45, and 50 kg weight categories, 0.2 seconds for the 55, 60, and 75 kg weight

categories, and 0.1 seconds for the 80 and +80 kg weight categories.

In the leg raise to the pull-up bar position, the difference between the beginning and end of the study was 2.1 repetitions for the 40, 45, and 50 kg weight categories.

The dynamics of the above-mentioned GFT and SFT indicators confirm the effectiveness of the developed program for improving the physical fitness of 15-17-year-old skilled hand-to-hand combat athletes.

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