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Influence of coordination training on physical fitness of 11-13 years karate athletes

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Abstract

Purpose: The research is an experimental substantiation of pedagogical technology for the development of coordination abilities of karate athletes of 11-13 years old.

Methods: Analysis and generalization of scientific and methodological literature allowed us to identify the anatomo-physiological features of adolescence, to define coordination abilities and identify their types, to reveal the main means and methods of development of coordination abilities, as well as the criteria for their evaluation. To evaluate the development of coordination abilities of karate athletes at the beginning and after the pedagogical experiment the athletes were tested. The selected test tasks met the following conditions: naturalness and accessibility in the performance of a certain test, comprehensiveness, providing versatility of the study, no need to use complex and expensive equipment, compliance with metrological parameters (standardization, informativeness, reproducibility).

Results: The experimental complexes included exercises on the coordination ladder consisting of 5 repetitive series. Each series lasting from 2 to 2.5 minutes contained 4 exercises, as well as one exercise to improve vestibular apparatus and balance functions.

Conlcusion: The effectiveness of using the proposed pedagogical technology in the training process of karate athletes has been proved. It allows to intensify the development of coordination abilities of the students, to improve the level of general physical fitness with a possible positive impact on competitive results, to improve the general health of students, as well as to form the motivation for training.

Keywords: karate, coordination abilities, coordination ladder, exercise complexes, efficiency.

Introduction

Karate, as one of the most popular and accessible sports, enjoys widespread popularity and popularity around the world. Historically, karate developed as a martial art and a means of self-defense, but over time it has evolved into a full-fledged sporting activity, which includes elements of sports training. Karate, unarmed martial-arts discipline employing kicking, striking, and defensive blocking with arms and legs. Emphasis is on concentrating as much of the body's power as possible at the point and instant of impact. Striking surfaces include the hands (particularly the knuckles and the outer edge), ball of the foot, heel, forearm, knee, and elbow. All are toughened by practice blows against padded surfaces or wood. Pine boards up to several inches in thickness can be broken by the bare hand or foot of an expert. Timing, tactics, and spirit, however, are each considered at least as important as physical toughening. Sports results in karate, as well as in other complex coordination sports, depend on the level of development of coordination abilities of athletes. Coordination abilities are a set of mastered motor coordinations that provide productive motor activity. It is a complex in structure ability. That is why in the program of children's sports schools the development of coordination abilities is an important part of the educational process and is considered as a basis, forming the fund of new motor skills and skills, as well as a prerequisite and basis for the successful development of other physical abilities[2,4].

Specialists in the field of sports science and coaches are constantly looking for new techniques and approaches to improve the coordination abilities of karate athletes in order to increase their competitiveness in the international arena and improve their overall sports performance. The relevance of the study lies in the need to develop and implement innovative pedagogical technologies aimed at the development of coordination abilities of karate athletes aged 11-13 years old.

According to experts, coordination abilities achieved at the initial stages of multi-year sports training are a prerequisite for successful mastering of the sport technique[3,1]. The purposeful development of coordination abilities, which are important for karate, allows to master more successfully the arsenal of technical and tactical techniques, enriches the motor experience and contributes to their more effective application in competitive fights [5]. Aspects of management and organization of the process of sports training of karate of different skill levels are considered in the existing literature widely enough, but the issue of improving coordination abilities in the training of karate in the age range of 11-13 years still remains a subject of

consideration and requires the search for new modern means of influence on these abilities, which determined the relevance of our study.

Methods

The pedagogical experiment was conducted on the basis of a sports school in Tashkent city. The participants of the experiment were distributed in the control group (CG) and experimental group (EG), 12 people in each. The control group conducted training process according to the program of the State Standard for the sport "Karate". In the experimental group in the preparatory part of training sessions for 6 months were integrated complexes of exercises on the coordination ladder.

Results and discussion

The experimental complexes included exercises on the coordination ladder consisting of 5 repetitive series. Each series lasting from 2 to 2.5 minutes contained 4 exercises, as well as one exercise to improve vestibular apparatus and balance functions. Exercises were performed at an intensity of 160 to 165 beats per minute, and the recovery period between series was 20 seconds. The length of the coordination ladder was 6 meters with sections of 50 cm each. The composition of exercises in the complexes was constantly varied. The complex of exercises for the development of coordination abilities on the coordination ladder was conducted in the preparatory part of the class. These complexes significantly influenced speed abilities, speed endurance and strength characteristics. Thus, the proposed technology is relevant for karate athletes, as karate requires a complex manifestation of physical qualities. All exercises were selected in such a way that they were not repeated and coordinated with the fulfillment of the main tasks of the training session.

According to the results of the initial testing of the participants' coordination ability, it was found that the control and experimental groups had a similar average level of physical fitness, at the initial stage of the study. The main task of the next stage of the experiment was to evaluate and test the effectiveness of the developed complex of training exercises aimed at the development of coordination abilities in karate athletes. The results before and after the pedagogical experiment are presented in Tables 1 and 2.

Thus, it is obvious that the experimental group showed more significant improvement in most of the exercises compared to the control group, which indicates the effectiveness of the proposed technology using the coordination ladder. All changes are statistically significant, which confirms the validity of the results.

Table 1. Dynamics of results of test exercises of the control group

Indicators	Running on the gymnastic bridge, 10 m. (sec)	Runs on the gymnastic bridge 10 sec. (number of times)	Alternate hand touching partner's shoulders 10sec, number of times)	Alternating Touching the opposite partner's foot for 10 seconds (number of times)	Walking in handstand (m)	Three forward somersaults (sec)	Swallow after somersault (sec)	Shuttle Run 3x10 (sec)
Initial	23,54	5,09	7,86	8,00	8,50	4,87	6,00	10,12
Final	23,41	5,02	8,32	8,69	8,75	4,65	6,76	10,10
Absolute	0,13	0,07	0,46	0,69	0,25	0,22	0,76	0,02
P	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05

Table 2. **Dynamics of the results of test exercises of the experimental group**

Indicators	Running on the gymnastic bridge, 10 m. (sec)	Runs on the gymnastic bridge 10 sec. (number of times)	Alternate hand touching partner's shoulders 10sec, number of times)	Alternating Touching the opposite partner's foot for 10 seconds (number of times)	Walking in handstand (m)	Three forward somersaults (sec)	Swallow after somersault (sec)	Shuttle Run 3x10 (sec)
Initial	23,35	5,12	7,62	7,96	8,70	4,91	6,03	10,09
Final	22,12	4,02	8,88	9, 92	9,95	4,02	7,92	9,96
Absolute	1,23	1,10	1,26	1,96	1,25	0,89	1,89	0,13
P	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05	p<0,05

Conclusion

The implemented complexes of exercises on the coordination ladder proved to be effective, which is clearly confirmed by the positive dynamics of the results of test exercises of karate athletes in the experimental group compared to the control group.

The experimental group recorded a more significant increase in the results of test exercises, as shown in Table 2. the organization of training allows structuring the introductory part of each training session in such a way that after the main warm-up and at the beginning of the main part, in parallel with the performance of the tasks of the training task, gradually develop various coordination abilities in karate.

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