

ORIGINAL SCIENTIFIC PAPER

Organizational Basics of Inclusive Education and Training Process for Karate Athletes with Disabilities

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Abstract

Physical education and sports for people with disabilities are the areas of physical and social rehabilitation. The implementation of this can be possible through the use of an inclusive approach in the training process of athletes with disabilities. Anthropometric measurements and testing of athletes with disabilities were conducted to determine the impact of an inclusive approach in the construction of the training process. The main purpose of this research was to demonstrate the positive impact of inclusive training sessions within the developed program on the development of the physical abilities of athletes with disabilities. The research used theoretical (analysis of scientific and methodological literature; analysis of sports programs for athletes with disabilities), empirical (pedagogical observation; pedagogical experiment) methods, as well as methods of mathematical statistics. The results of the research showed a positive impact from the training on the developed karate program for people with disabilities. It also presented the increase of the testing results in the exercises "Sit and reach test", "Standing long jump" and "Abdominal crunches".

Keywords: inclusive training process, physical development, physical fitness, athletes with disabilities, karate, adaptive physical culture, adaptive sport

Introduction

Analysis of practical experience of training in karate and scientific basis of the results of researches of national and foreign experts in the field of adaptive physical culture allowed to describe the basic theoretical and methodological foundations and provisions of training athletes with disabilities (Kohut, & Goncharenko, 2013, 2018; Greco, Fischetti, Cataldi, & Latino, 2019; Imas, Borysova, Kohut, Yarmolenko, & Shlonska, 2018). The problem of constructing the educational process for athletes with disabilities (karate athletes) is currently of sharp interest due to current national and world trends occurring in the educational, scientific and sports space (Kohut et al., 2018, 2019). In particular, the inclusive education is introduced at the educational establishments of different levels, various scientific research on determining the impact of joint trainings for people with disabilities and athletes are carried out. In the research of national and foreign specialists in the field of physical culture and sports, some aspects concerning inclusive physical education have been shown (Mihajlovic, 2017; Mc-Grath, Crawford, & O'Sullivan, 2019). Generalization of recent sources and materials of the internet has revealed that the problems of realization of inclusive physical education and specific principles of physical education of children of preschool age in the conditions of inclusive education are raised in the works of Pasichnyk (2017). Adyrkhaieva (2016) has written about modern technologies of physical education of students with disabilities in the conditions of inclusive education. Troyanovska (2018) has observed the theoretical aspects of physical education classes with students with special educational needs in the conditions of inclusive education. However, the issue of an inclusive training process has remained unaddressed by scientists.

It was assumed that implementation of the developed karate



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program for people with disabilities would increase the level of physical development and physical fitness of this group of people.

The aim of the research was to substantiate organizational principles of inclusive educational process for karate athletes with disabilities.

Methods

Research participants

The research involved athletes of 14-20 years old (5 boys and 5 girls) with disabilities of different genders who have cerebral palsy, physical retardation and autism. The children and their parents were informed of all the features of the research and agreed to participate in the study.

Research organization

To achieve the research objectives, the following methods were applied: analysis of scientific and methodological literature and Internet materials, pedagogical observation, pedagogical experiment (pedagogical testing), methods of mathematical statistics and processing of research results.

The test battery included four tests to determine the level of fitness: abdominal crunches maximum number in 1 min. (strength endurance), standing long jump (power), 60 meters running (speed), sit and reach test (flexibility). Anthropometric indicators were used to determine the level of physical development: height, body weight. During the experimental study athletes were engaged in the developed program "Karate - train together" for 1 year with a frequency of training of 2 times a week for 2 hours. The program of the first year of study is the one to be aimed at developing the physical qualities of athletes in its practical part, and is intended to increase the level of physical fitness of athletes with disabilities.

Statistical analysis

The statistical methods (means, standard deviations and Wilcoxon signed-rank test) were used for quantitative processing of results and allowed to draw conclusions about the effectiveness of the training program for karate athletes with disabilities, which is based on an inclusive approach. It also allowed finding out the dynamics of quantitative changes in levels of their physical development and preparation before and after the scientific research. We

Table 1. Anthropometric data of the studied children

performed statistical analyses using Statistica 6.0 for Windows (StatSoft, USA). Since we had a small sample, Shapiro-Wilk's test of normality did not have enough power, and the histograms were far from a normal distribution we adopted non-parametric statistical tests. As a result, median and interquartile range [25%; 75%] were used to describe the data and Wilcoxon's signed-ranks test was used to compare the parameters of physical development before and after the author's training program. The threshold of statistical significance p=0.05 was accepted.

The study was approved by the Institutional Ethics Committee (\mathbb{N} 2/2017) and was carried in compliance with the international principles of the Declaration of Helsinki of the World Medical Association (2013) and in accordance with the Law of Ukraine "Basis of Ukrainian Health Care Legislation" (1992) on ethical norms and rules of medical research with human participation.

The research protocol was approved by the Center for Social and Psychological Rehabilitation of Children and Youth with Functional Disabilities of Darnytskyi District (Kyiv, Ukraine). In addition, children and their parents or legal caretakers were fully informed of all the features of the research and consent forms were duly signed.

Results

To determine the effectiveness of an inclusive approach to the construction of the training process of karate athletes with disabilities, anthropometric measurements and testing of athletes were conducted, which included two stages (summative assessment of I and II phases of the study). The research was conducted on the basis of the Center for Social and Psychological Rehabilitation of Children and Youth with Functional Disabilities of Darnytskyi District from October 2017 to October 2018. It was created based on the WKF karate training program for children and youth sports schools. The general principles of the organization of the educational and training process according to this program were the individual approach, the sequence and gradual presentation of the material. The methods used in the classes depended on the complexity of the tasks and the individual characteristics of the athletes. The practical part of the program was aimed at the development of physical qualities: strength, endurance, coordination,

News	Age		Height (cm)		Body weight (kg)		Necelogy	
Name	I	П	I	П	I	II	Nosology	
Maks*	16	17	161	165	55	59	Cerebral palsy	
Bobby*	16	17	170	172	62	67	Cerebral palsy	
Viola*	14	15	152	155	51	53	Physical retardation	
Alexis*	18	19	166	166	60	59	Autism	
Andry*	14	15	158	160	49	52	Physical retardation	
Jim*	19	20	170	170	61	60	Cerebral palsy	
Alex*	16	17	168	172	58	62	Cerebral palsy	
Tim*	16	17	169	173	61	62	Cerebral palsy	
Alice*	16	17	165	166	56	58	Cerebral palsy	
Eva*	16	17	165	165	55	53	Cerebral palsy	
			N = 10 Z = 2.366 p = 0.018		N = 10 Z = 1.886 p = 0.059			

Legend: * - pseudonym used; I - summative assessment of the I phase of the study; II - summative assessment of the II phase of the study.

flexibility and speed, which was characterized by the implementation of appropriate physical exercises to increase the level of physical fitness of athletes.

For the implementation of the first component (summative assessment of the I phase of the study), a study was conducted, which allowed to assess the level of physical development and health status of children with disabilities.

The results obtained are presented as a following Table 1.

The assessment of the physical development of the studied group of children was conducted when comparing the actual indicators (summative assessment of I and II phases of the study) and the necessary anthropometric indicators for the physical development of children.

The measurement results of athletes are distributed in comparison with centile intervals according to WHO recommendations.

It was found that at the beginning of the study, 90% of children had average growth rates that corresponded to 25–75% of the centile interval and 10% had low growth rates (corresponding to 3–10% of the centile interval). After comparing the results of the summative assessment of I and II phases of the study, it was determined that the number of children with average growth increased by 10%.

At the same time, it was found that 100% of the children studied had average body weight at the beginning and end of the study and it corresponded to 25–75% of the centile interval.

To carry out the second component of research (formative assessment) the educational and training process was constructed according to the developed method of training for karate athletes with disabilities. During this study, a karate training program for athletes with disabilities was developed and put into practice during from 2017 to 2018.

For the implementation of the third component of the study (summative assessment of the II phase of the study), which was conducted to identify changes in the level of physical fitness of children with disabilities using the new training program, a research of the level of physical fitness of children with disabilities was carried out. Its complexity was almost the same as the previous one. For this purpose, as well as for the first time, testing and standards of assessment of physical fitness were used (Table 2).

Table 2. Indicators of	ⁱ physica	l fitness o	f children	of the stud	y group
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Name	Sit and reach test (cm)		Standing long jump (cm)		Abdominal crunches, 1 min, number of repetitions		60 meters running, sec	
	I	II	I	II	I	II	I	II
Maks*	6	8	98	100	16	20	12	12
Bobby*	5	9	129	130	17	22	11	11
Viola*	8	10	78	78	14	18	13	13
Alexis*	9	12	114	115	15	19	12	12
Andry*	6	11	109	113	18	24	13	13
Jim*	4	8	94	96	14	21	12	12
Alex*	6	12	131	136	19	25	10	10
Tim*	5	11	132	135	18	26	10	10
Alice*	7	12	124	128	16	20	11	11
Eva*	7	13	119	124	15	21	11	11
	N = 10 Z = 2.803 p = 0.005		N = 10 Z = 2.666 p = 0.008		N = 10 Z = 2.803 p = 0.005			

To carry out the fourth component of the research (processing and generalization of results), the analysis and systematization of the obtained results were carried out. To clearly demonstrate the effectiveness of the training program, a comparison of the results of the summative assessment of I and II phases of the study was performed.

The test "Sit and reach test" involves sitting on the floor with legs stretched out straight ahead. Both knees should be locked and pressed flat to the floor - the assistant may help by holding them down.

However, during the research, in order to assimilate the technical part of the tests, auxiliary exercises were performed for the development of flexibility, namely: angle bodies (pulling the torso with the hands to the lower leg, leaning forward with the help of a partner or with some weight on the shoulders, passive bending and extension of legs with the help of the partner with the subsequent holding of a static position, bending of straight legs in the hip joint with the help of the partner from the lying position, etc.). A significant improvement in the test technique was observed during the summative assessment of the II phase of the study. The muscle strength and elasticity have both increased, the exercise techniques have improved, which led to better-quality results.

To determine further changes in the development of flexibility of the athletes, the test "Sit and reach test" was carried out (Figure 1).

Comparison of the results of the flexibility test showed that the level of flexibility of athletes increased after training under the developed curriculum. This indicates the effectiveness of the program's lessons and the correct use of the techniques. The training before the development of flexibility required the necessary intense warm-up to improve blood flow and increase muscle elasticity. Exercises were performed with the following recommendations: use of repeated spring motions that increase the intensity of stretching, performing of the movements with the highest possible



amplitude, use of the motion inertia of any part of the body, work with additional external support and with the active assistance of a partner.

During the first standing long jump test, it was found that 50% of the athletes made some mistakes while performing the test (line delay, loss of equilibrium on landing, etc.). To solve this problem, they were asked to perform the following exercises, namely: jumping rope, jumping on the left, right, both legs, jumping back and forth from the seated position, performing swing half-bent hands with a sharp stop at the position of the elbows at the level of the shoulder girdle, standing long jumps for accuracy and result. During the second test, the standing long jump technique improved, but not for the entire research group. This is due to the features of diseases that limit the physical capacity of children.

To determine the changes in the development of the speed and power capabilities of the athletes the test "Standing long jump" was performed (Figure 2).



Comparisons of the results of the test "Standing long jump" showed that 90% of the athletes improved their speed and power capabilities. However, 10% of them remained unchanged. The data obtained indicate that the proposed method of development of the speed and power capabilities of the organism is effective, but not suitable for all groups. Research has found that children with cerebral palsy and autism have improved their rates. In the diagnosis of physical retardation, improvement of the result did not occur, which indicates the need to refine the methodology for the development of the speed and power capabilities or change the control test for this group.

When performing Abdominal crunches test, no errors

were detected in any of the study, although the number of elevations counted was significantly different. This can be explained by the strengthening of the external and internal muscles of the abdomen of the athletes.

During the determination of changes in the development of the strength endurance of the athletes, the test "Abdominal crunches" was performed (Figure 3).

The results of the comparison of the test "Abdominal crunches" showed that the level of endurance was noticeably increased. The results showed a positive impact of the "Karate – train together" program on the development of the strength endurance of athletes with disabilities.

The test "60 meters running" was performed from a high



FIGURE 3. The level of development of strength endurance of the athletes (Number of repetitions)

start on special tracks in the gym. During the first run of the test, the athletes made some mistakes that were due to their level of health and physical development. In the first phase of the research, not everyone was able to run 60 metres in one attempt. To solve this problem, a series of exercises were performed throughout the research, which improved the body ability to perform it. Movement speed was improved by increasing the level of neuromuscular coordination, muscle strength, and by improving the body ability to exert great muscular effort. The following methods were used for the development of speed: repetition (exercise with maximum speed), circular training (involvement of major muscle groups), game (exercise for speed in motive games, relay and sports games), competition (performance of exercise with maximum speed while competing with each other).

To determine changes in the development of speed capabilities, the test «60 meters running» was performed. There were no significant differences in the level of development of speed capabilities of the athletes after a pedagogical experiment on the author's program.

The results of the research showed that the data of the test "60 meters running" remained unchanged in 100% of cases after training under the developed training program. The results obtained indicate that this training affects the development of flexibility, strength and endurance, but does not develop speed and only support the level of its development. However, it is important to note that during the second study, all athletes were able to perform the test on the first attempt, although they did not improve their time, which can also be considered a positive result.

Discussion

Analysis of the results of studies of specialists in the field of physical culture and sports (including karate) showed that the vast majority of researches are aimed at studying the features of technical and tactical training of athletes (Ermakov & Boychenko, 2010), the development of an individual approach to the technical training of athletes (Ashanin & Litvinenko, 2011) and a general description and analysis of techniques of tactical and technical training in karate (Sedenkov & Britvina, 2012). The features of competitive activity in karate and methods of individualization of technical preparation of athletes are presented in the aforementioned works. Most karate studies have identified the original models of competitive activity, and therefore sports training. The training process in karate (among athletes without developmental disabilities) is mainly aimed at increasing the level of technical and tactical training, which is based on an individual approach. Our research has shown that a special feature of the training process for athletes with disabilities is the use of an inclusive approach to increase the level of physical development and physical fitness of athletes.

The organization of the training process for athletes with disabilities and athletes without developmental disabilities has significant differences. First, psychological and physical training plays a significant role in the training process for athletes with disabilities, while physical, technical, tactical, psychological and integral training is equally important for athletes without developmental disabilities. Secondly, general preparation training is more prevalent for athletes with disabilities, as opposed to special training and competitive one for athletes without developmental disabilities (due to the complexity of the tasks). Thirdly, training of people with disabilities is most often used in visual (demonstration of exercises and their elements by a trainer or qualified athlete) and practical (aimed at developing motor skills) methods. To a lesser extent, karate for athletes with disabilities uses verbal methods that use specific terminology in combination with visual methods. A group of practical methods aimed at mastering of sports technique (formation of motor skills) is presented in the training process of both athletes without developmental disabilities and athletes with disabilities. The structure of practical training methods for both is presented within the framework of the continuous, interval, playing and competitive methods.

The main task of an inclusive approach in the organization of the training process of athletes is their socialization and integration into the society. It has been scientifically proven that inclusive physical education and sports have a positive impact on all participants in the training process (Klavina, Ostrovska, & Campa, 2017; Mihajlovic, 2017; McGrath et al., 2019). Today, the "Unified Sports" Special Olympics program solves similar tasks, which promotes the integration of athletes with intellectual disabilities into society and enables both Special Olympics athletes and their partners to improve their sports and social skills. By analyzing the results of the questionnaire of parents and coaches in our research, we also proved the positive social and humanistic impact of the "Karate – train together" developed program on all participants of the training process.

Conclusions

Therefore, the results obtained, namely the improvement of the level of physical development indicators (height, body weight) and physical fitness (level of development of flexibility, speed and power capabilities, strength endurance) testify to the effectiveness of the application of the developed karate training program for athletes with disabilities during training process. While conducting the summative assessment of the II phase of the study, the athletes mastered the proper technique

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Conflict of Interest

The authors declare that there are no conflicts of interest.

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of performing the proposed exercises and fully performed all the physical tests without making mistakes in execution. The indicators of the test "Sit and reach test" improved overall by 73.1% with the test "Standing long jump" by 2.3% and the test "Abdominal crunches" by 33.4%. The performance of the test "60 meters running" remained unchanged. Increasing the level of physical development of children states the correctness of the selected exercises and techniques in the program, the adequacy of the load and the efficacy of using the proposed methodology when working with children with cerebral palsy, physical retardation, and autism.

The results of the study can be used by experts in the field of physical culture and sports in writing inclusive programs for other sports and working with people with disabilities.

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