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OPTIMIZATION OF PHYSICAL TRAINING PROCESS OF 10-11 YEARS OLD ATHLETES WITH HEARING IMPAIRMENT INGAGED IN JU-JITSU

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Purpose: to determine the changes in the level of physical fitness of athletes 10-11 years old with hearing impairment under the influence of ju-jitsu classes.

Material and methods: 12 young athletes with hearing impairments (10-11 years old) - representatives of the Poltava Regional Center for Physical Culture and Sports of Disabled People "Invasport" of the Poltava Regional Council took part in the study. The research was carried out on the basis of the sports hall of the Poltava Training Center from September 2019 to February 2020. To solve the set research tasks, the following complex of methods was used: analysis of scientific and methodological literature; pedagogical observation; pedagogical testing; methods of mathematical statistics. Determination of changes in the level of physical fitness of young athletes with hearing impairments, engaged in ju-jitsu, during the experiment, was carried out using a block of control tests.

Results: using a comparative analysis of the average test indicators, a statistically significant increase in the results was revealed: speed-strength qualities ("Standing long jump", (t = 7.24) strength qualities ("Push ups"; t = 7.19, "Pulling up "; t = 5.93) speed ("30 m run"; t = 6.63) agility and coordination abilities ("Shuttle run 4x9 m"; t = 6.46) flexibility ("Tilt of the trunk forward from a sitting position"; t = 5.00).

Conclusions: the construction of the training sessions taking into account the specific characteristics of athletes with hearing impairment, namely the use of acrobatic exercises in the preparatory part of classes and the use of special means for correcting body functions, correcting and developing coordination abilities; balance function correction; correction of vestibular function, contributed to the creation of conditions for improving the physical fitness of children 10-11 years old, engaged in ju-jitsu.
Keywords: jiu-jitsu, young athletes, physical preparedness, athletes with hearing impairments.

Introduction

Physical training takes a special place in the system of sports training, since only under the condition of a proper level of development of physical qualities, athletes can quickly and efficiently master techniques and tactical actions, and also effectively apply them in the process of intense competitive activity [6, 7, 12, 21].

The physical preparedness of athletes, according to the definition of many specialists, is of particular importance in the field of adaptive sports [8, 9, 20, 22, 23].

Numerous scientific studies show that dysfunction of the auditory analyzer leads to a negative impact on the entire process of human development. It is noted that with complete or partial impairment of hearing functions in athletes, not only a lag in their physical development is manifested, but also a decrease in indicators of physical development in comparison with healthy athletes [3, 4, 13, 18].

An important direction and urgent are the issues of improving the physical condition and health of children with hearing impairments, improving physical development, prevention and correction of disorders in the process of their development [5, 10, 15].

It should be noted that one of the best ways to strengthen and restore health is playing sports, and especially ju-jitsu, as one of the most popular modern systems of martial arts, the purpose of which is to achieve physical and moral improvement [1, 2, 14, 19].

Ju-jitsu training improves physical status, contributes to the harmonious development of motor qualities, increases the emotional state, creates the necessary conditions to ensure the correction of motor changes and increase the performance of the body of athletes with hearing impairments.

At the same time, the training of young athletes with hearing impairments in ju-jitsu requires further research on the features of the organization of educational and training sessions, methods of developing physical qualities, the development of the optimal dosage of loads, the duration and nature of rest, and predetermines the relevance and social significance of the chosen research topic.

The purpose of the reseach is to determine the changes in the level of physical fitness of young athletes of 10-11 years old with hearing impairments under the influence of ju-jitsu classes.

Material and Methods of the research

The study involved 12 young athletes with hearing impairments (10-11 years old) - representatives of the Poltava Regional Center for Physical Culture and Sports for Disabled People "Invasport" of the Poltava Regional Council. The reseach was carried out on the basis of the sports hall of the Poltava Training Center from September 2019 to February 2020. The following complex of methods was used for the reseach: analysis of scientific and methodological literature; pedagogical observation; pedagogical testing; methods of mathematical statistics.

Results of the research

During the research, a new structure of training lessons was introduced into the training process of young athletes with hearing impairments (Table 1).

Educational and training sessions for young athletes with hearing impairments who practice ju-jitsu were built according to a scheme with a total duration of 90 minutes using the preparatory (20 minutes), main (60 minutes) and final (10 minutes) parts.

Table 1

Scheme of a training lesson for young athletes with hearing impairments 10-11 years old who practice ju-jitsu

	Content	Dosage, min.	Methodical instructions
Preparatory part, 20 minutes	Line up. Announcement of lesson tasks.	2	Performed by the whole group
	Running exercises	3	
	General and developmental exercises	5	
	Special exercises	5	
	Acrobatic exercises	5	
Main part, 60 minutes	Acquaintance or training in technical actions	14	Pay attention to mistakes when performing exercises
	Recreation	4	Performed by the whole group
	Special means of correction of body functions or simulation exercises with a partner	10	Pay due attention to differentiated and individual approaches
	Recreation	4	Performed by the whole group
	Development of physical qualities	14	Differentiated approach
	Recreation	4	Performed by the whole group
	Moving games or relays	10	The content of the game must correspond to the age characteristics of physical and mental development
Final part, 10 minutes	Relaxation exercises, flexibility exercises, breathing exercises	6	Performed by the whole group
	Summing up, analysis of the lesson	4	Perform the tasks of the lesson, point out mistakes, mark the most successful

According to the definition of specialists R.V. Chudnoi [16] and L. V. Shapkova [17], to overcome the negative consequences of the influence of a sensory defect on the social and physical development of athletes with hearing impairment, specially organized physical culture and adaptive sports classes help their physical preparedness. Therefore, in the preparatory part of the training session, in addition to the general part of the warm-up, which was aimed at an effective transition to the main work due to the activation of the functions of the central nervous system and other body systems, a special part was used using exercises as close as possible in structure and effect on the athlete's body to upcoming training activities, where the mandatory component was the use of acrobatic exercises. These

exercises were divided into two groups. The first group included dynamic exercises associated with partial or complete overturning over the head in different directions, namely rolls, somersaults, overturns, arc movements. The second group included static exercises that were associated with keeping the body in balance in various positions: stands, bridges, splits.

In the main part of the lesson, exercises were performed in accordance with the tasks determined for each lesson individually, but had to adhere to a certain logical sequence regarding: technical training, exercises of correctional and rehabilitation orientation, development of physical qualities.

In order to increase the motor density of the training session to 60-70%, when changing the type of training, active rest was used: a set of exercises to relax the muscles of the arms, muscles of the legs, muscles of the trunk, since switching from one type of activity to another favorably affects the acceleration of recovery processes.

In the process of developing physical qualities, they mostly adhered to the principle of gradualness and consistency, multiple repetitions of the same technique.

A feature of the planning of individual training sessions was their complex nature, providing for the simultaneous development of various qualities and abilities of an athlete, since they are more emotional, have a versatile effect on the functional and mental sphere of a young athlete and to a greater extent contribute to the preferential development of individual properties and abilities of an athlete and correspond to the task of training young athletes with hearing impairment.

The main principles of constructing classes for young athletes with hearing impairments were: the universality of the tasks, the choice of means and methods in relation to all pupils, compliance with a differentiated and especially individual approach and a deep study of the characteristics of each athlete.

On the basis of the analysis of the results, which were shown in the repeated testing, in general, the positive dynamics of the development of physical preparedness of young athletes with hearing impairments, who go in for ju-jitsu, were determined (Table 2).

Table 2

Physical preparedness indices of young athletes with hearing impairments, practicing ju-jitsu at the beginning and at the end of the study (n=12)

№	Control tests	Term of testing	$\bar{x} \pm m$	t	p
1	Pull-ups, number of times	At the beginning	4,1±1,2	5,93	<0,001
		At the end	5,4±1,2		
2	Standing long jump, cm	At the beginning	123±8,1	7,24	<0,001
		At the end	133±10,5		
3	Push-ups, number of times	At the beginning	10,8±3,3	7,19	<0,001
		At the end	13,25±3,8		
4	Running for 30 m, s	At the beginning	6,6±0,3	6,63	<0,001
		At the end	6,4±0,3		
5	Shuttle run 4 x 9 m, s	At the beginning	12,5±0,5	6,46	<0,001
		At the end	12,2±0,4		
6	Tilt of the trunk forward from a sitting position, cm	At the beginning	3,5±1,5	5,00	<0,001
		At the end	4,8±1,4		

Analysis of the data using a paired two-sample t-test for average indicators revealed that the greatest changes in indicators occurred in the development of speed-strength qualities when using the test "Standing long jump"; t = 7,24; p <0,001. This was facilitated by the use of special means of correction and the use of various types of jumps in training sessions.

The use of acrobatic exercises, special means of correcting body functions, complexes for the development of physical qualities, outdoor games and relay races when organizing classes for young athletes with hearing impairments contributed to a higher statistically significant growth of indicators in other tests. Thus, a significant improvement in the results was obtained in the tests: "Push-ups"; t = 7,19; p <0,001; "Pulling up on the bar"; t = 5,93; p <0,001; "Running for 30 m"; t = 6,63; p <0,001; "Shuttle run 4x9 m"; t = 6,46; p <0,001; "Tilting the trunk forward from a sitting position"; t=5,00; p<0,001, (Table 2).

The greatest gains in performance were found in the development of flexibility and strength. Thus, the average group results in the test "Tilt of the trunk forward from a sitting position" increased from 3,5 cm to 4,8 cm, which amounted to an increase of 37,1%. In the test "Pulling up on the bar" from 4.1 to 5.4 times (31,7%), and in the test "Push-ups " from 10,8 to 13.3 times (23,1%). This is due to the use of

directed work to simultaneously correct and develop strength and flexibility, which ensured a more effective development of strength and flexibility.

The smallest percentage of results increase is observed in the tests: "Shuttle run 4x9 m", according to the definition of the development of dexterity and coordination abilities, the indicators of which improved from 12,5 s to 12,2 s (2,5%); "30 m run", according to the definition of the development of speed qualities, the indicators of which improved from 6,6 s to 6,4 s (3,1%); as well as in the development of speed-strength qualities using the test "Standing long jump", the average indicators of which improved from 123 cm to 133 cm and amounted to 8.1%. The lower development of quickness, dexterity and coordination abilities and speed-strength qualities can be explained by the peculiarities of functional disorders of persons with hearing impairments, namely: insufficient coordination and uncertainty of movements; low level of development of spatial orientation; an increase in the time of motor reaction and reaction to choose; lagging behind in jumping ability; low rate of movement; deterioration of motor memory.

At the same time, a correlation analysis was carried out between the results that were shown in tests during the experiment, it was revealed that there is a high connection between speed-strength qualities and speed qualities (r = 0.89), speed-strength qualities, manifestations of dexterity and coordination abilities (r = 0.65), speed qualities and agility and coordination abilities (r = 0.70) (Table 3).

Table 3

Value of the correlation between the test scores of young athletes with hearing impairments who practice ju-jitsu (n=12)

№	Test	1	2	3	4	5	6
1	Pull-ups, number of times	1,00					
2	Standing long jump, cm	0,51	1,00				
3	Push-ups, number of times	-0,31	-0,15	1,0			
4	Running for 30 m, s	-0,18	**-0,89**	0,03	1,00		
5	Shuttle run 4 x 9 m, s	-0,29	**-0,65**	0,01	**0,70**	1,00	
6	Tilt of the trunk forward from a sitting position, cm	0,17	-0,09	-0,05	0,19	0,02	1,00

Determination of the correlation between test indicators thoroughly proves the effectiveness of the use of correctional work in training sessions with the help of special means, for the purpose of directed individual development, which included: 1) means of correction and development of coordination abilities: long and high jumps from a place and from a run to maximum result or a given distance, jumping over barriers of different heights and distances between them (overcoming the feeling of fear); 2) means for correcting the balance function: running along a straight line, jumping on one leg, running with objects on outstretched arms (ball, gymnastic stick) 180 °, 360 ° (the same with jumps).

Conclusions / Discussion

According to research by Yu.A. Peganov and A.G. Spitsyn [11] sports programs and methods of physical education for athletes with hearing impairment should be focused not only on general physical development, but to a greater extent on elimination of physical disabilities. In this regard, for the physical development of deaf children, strength exercises are used with weights of their own weight with the implementation of a targeted effect on the development of the main muscle groups, exercises for the correction and development of flexibility (sitting, exercises with objects; at the support; in pairs), the simultaneous development of strength and flexibility, as well as the circuit training method. The basis of the methodology of physical development is the cross use of general developmental and special exercises, organized according to the rule of “cross load” on muscle groups and assumed the implementation of exercises that contribute to the consistent inclusion of relatively autonomous muscle groups in the work.

To optimize the process of physical training of young athletes of 10-11 years old with hearing impairments, practicing ju-jitsu, the structure of the training lesson was built, which had its own specific features, namely, the use of acrobatic exercises in the preparatory part of the lesson and the use of special means of correcting body functions: means of correction and development of coordination abilities; balance function correction means; means of correction of vestibular function.

The construction of the structure of training sessions, taking into account the specific features, which was aimed at the development of the basic physical qualities and functional systems of young athletes with hearing impairments, contributed to the creation of conditions for a sufficiently appropriate improvement of the physical fitness of children, confirms the data of A.V. Mutyeva [10].

Therefore, at each lesson, the play method of training was used, since in the process of playing children not only master many motor skills and abilities useful for life, but play is also an excellent means of developing physical qualities and forming a sustainable interest in sports.

According to A.V. Podulibinoi [13], active movements due to the content of outdoor games and relay races, cause positive emotions in children with hearing impairment and create psychological comfort in the classroom, strengthening all physical and mental processes. The game exercises and tasks that we used in the preparation process contributed not only to the development of communication skills, but also to social adaptation, favorably influenced the psychomotor and communication skills of children with hearing impairments.

In the final part, relaxation exercises, flexibility exercises, breathing exercises were used, which made it possible to reduce the body's response to the presented load.

A statistically significant increase in the average group results was revealed: speed-strength qualities, test "Standing long jump" from 123 cm to 133 cm (t=7,24) development of strength qualities, test "Push-ups" from 10,8 to 13,3 times (t=7,19); development of speed, test "Running for 30 m" from 6,6 s to 6,4 s (t = 6.63) development of dexterity and coordination abilities, test "Shuttle run 4x9 m" from 12.5 s to 12,2 s (t = 6.46) development of strength qualities, test "Pulling up on the bar" from 4,1 to 5,4 times (t = 5.93) development of flexibility, test "Tilt of the trunk forward from a sitting position" from 3.5 cm up to 4.8 cm (t=5,00).

The prospect for further research are in the development of the construction of educational and training programs in various types of adaptive sports.

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