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INFLUENCE OF EXERCISES WITH A BALL ON COORDINATION ABILITIES OF 8-9-YEAR-OLD YOUNG SPORTSMEN, ENGAGED IN TABLE TENNIS

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Purpose: to develop approaches to improve the coordination abilities of young sportsmen in table tennis under the influence of specially selected exercises with a tennis ball.

Material and methods: two groups of young pupils at the age of 8-9 years in the total number of 24 persons (control group, n=12, experimental group, n=12) of the children's and youth sports school No. 11 in Kharkov took part in the research. The tests recommended by the curriculum for children's and youth table tennis sports schools were used to determine the indicators of coordination abilities. The pedagogical experiment lasted 3 months and consisted of the introduction into practice of the experimental group of specially selected exercises.

Results of introducing exercises with tennis balls aimed at developing coordination abilities into the educational and training process of the experimental group of 8-9-year-old pupils in table tennis, a reliable improvement in the indicators of test exercises were revealed: in hitting a tennis ball on a racket for 1 minute, on the inside and the outside of the racket and alternating the side of the racket, run

sideways around the table, running on the eight ($p<0,05$). No probable difference was found in tests: tossing and catching a tennis ball with two hands in 30s, transfer balls while moving in a 3-meter zone, ($p>0,05$).

Conclusions: the improvement of manifestations of coordination abilities in 8-9-year-old children of the experimental group who are engaged in table tennis, after the introduction of the specially selected exercise system into the training process, amounted to: in the test "Hitting a tennis ball on a racket for 1 minute on the inside" - 25,3%, "Hitting a tennis ball on a racket for 1 minute on the outside of the racket" - 27,3%, "Hitting a tennis ball on a racket for 1 minute on the inside and the outside of the racket in turn" - 39,0%, "Tossing and catching a tennis ball with two hands no higher than the head in 30s" - 5,5%, "Run sideways around the table" - 5,8%, "Running in the eight" - 2,5%, "Transfer of balls while moving in a 3-meter zone" – 2,7%.

Keywords: table tennis; coordination capacities; exercises with balls; exercises with a racket.

Introduction

Coordination abilities are difficult, complex psychophysical quality. They are related to the control function, which means that the central nervous system plays the main role in the manifestation of this quality. This circumstance is also because coordination capabilities are more versatile, flexible, and universal physical quality compared to others. R. Khudiets attributes table tennis to difficult coordination sports. The author notes that the player's actions depend on several factors: speed of the flight of a tennis ball, speed of the stroke, and the time required to make a decision when attacking the opponent [16].

The process of mastering any motor actions is much more successful if a sportsman hasn't only strong and fast muscles, flexible body, but also highly developed abilities to control his movements, his main characteristics. The high level of development of coordination abilities is the main base of mastery of new, more complex types of motor actions in sports activity [15].

The high level of coordination capacity is particularly important for children during the initial training phase. As advanced coordination allows a child to master new motor actions quickly, to be in movement, and to respond to changing environment quickly. By developing the coordination of young sportsmen, you can lay an important base for the formation of complex motor skills, as well as self-confidence, against the background of existing motor skills.

Such coordination abilities as the ability to differentiate muscle forces, sense of rhythm, rapid restructuring of motor activity, statokinetic stability, and the ability to harmonize movements are important in achieving high sports results and in owning effective technique for table tennis.

Kolomiytseva O., Radchenko Ya. It is noted that table tennis itself is a mean of developing coordination abilities. This is due to the performance of a large number of serves and various strokes during the match [5]. Hloba T.A. has a similar opinion, who proposes to use table tennis in the process of students' physical education classes to develop coordination abilities [2].

Roman Faichak, Serhiy Popel, Ivan Faichak improved the manifestation of the coordination abilities of those who were engaged at the end of the pedagogical experiment, which lasted 8 months during the school year, where students-tennis players used the proposed method for the development of individual components of coordination abilities, built on blocks of exercises, which were performed during warm-up for training and in self-study. Maleniuk T.V. proposed for students-tennis players the experimental method for the development of coordination abilities using blocks of exercises to improve the ability to control temporal, spatial, and power parameters of movement, to improve the ability to orient in space, the feeling of rhythm, and the feeling of a ball. The main provisions of the author's method for improving coordination abilities: training method - repeated; duration of exercises - short-term; the intensity of exercise performance is maximum or submaximal; rest intervals duration - full recovery; nature of rest intervals - passive or mixed; the number of repetitions - until tired. The pedagogical experiment continued during the school year. At the end of the experiment, the author notes a reliable improvement in

the result in indicators of orientation in space and accuracy of movements ($p<0,05$) [7].

We identified indicators of technical [1] and special physical fitness of sportsmen in the basic training group of table tennis [18] in the previous researches. The relationship of psychophysiological indicators and indicators of technical fitness of sportsmen in table tennis was considered.

Our previous researches focused on the adaptation of youth with musculoskeletal system disorders due to the development of coordination abilities in them [23, 24]. Indicators of coordination abilities of pupils of the Republic of China were studied [22]. The methodology for improving the technical preparedness of young handball players was developed and confirmed experimentally based on the use of coordination exercises on the high-speed coordination ladder [20]. The state of coordination abilities of basketball players of the student team was analyzed [11], and the method of its enhancement was tested due to the use of specially selected exercises with a ball [10]. The results of our previous researches made it possible to establish the level of indicators of the spatial orientation of 14-year-old female basketball players [21]. Indicators of 12-year-old basketball players' balance were studied, and a significant effect of exercises on the balancing platform on statokinetic stability of young players was established [12]. The obtained results provide some foundation for our approaches for this research.

According to the results of the researches, we can assume that the use of specially selected exercises with a tennis ball, a tennis racket, and exercises with elements of technical techniques of table tennis can increase the level of coordination motor actions of sportsmen.

Connection of the research with scientific programs, plans, topics. The research was carried out by the theme of the plan SW of Kharkiv state academy of physical culture "The improvement of the educational and training process in sports games" for 2019-2023.

The purpose of the research is to develop approaches to improve the coordination abilities of young sportsmen in table tennis under the influence of specially selected exercises with a tennis ball.

Research tasks:

1. To analyze the scientific and methodological literature on the selected topic.

2. To determine the level of development of individual coordination abilities of 8-9-year-old players who are engaged in table tennis.

3. To select and to prove experimentally the effectiveness of using specially selected exercises for the development of individual coordination abilities of tennis players.

Material and Methods of the research

Two groups of young pupils at the age of 8-9 years in the total number of 20 persons (control group, n = 10, experimental group, n = 10) of the children's and youth sports school No. 11 in Kharkiv took part in the research. Both groups are elementary education of the second year. The tests recommended by the curriculum for children's and youth table tennis sports schools were used to determine the indicators of coordination abilities [8]. The pedagogical experiment lasted 3 months and consisted of the introduction into practice of the experimental group of specially selected exercises. These are exercises in which a tennis ball was stroked from the wall (strokes from the wall with catching after applause behind the back, 360° rotation, squat after one hit on the floor); exercises with tossing a tennis ball with a hand and catching or with a hand or plastic cup (shifting a plastic cup from hand to hand, performing several shots in a row) while trying not to get out of place; hitting a tennis ball with the racket, changing the side of the racket, with right and left hand, both in place and in movement (moving frontward and back forward, with a side step to the right, to the left); throwing a tennis ball to the accuracy in squares are drawn on the tennis table, and strokes for accuracy with a racket in markings; strokes, loops from different angles of the table to given sectors; strokes in different ways for changing the tennis table (two tables stood side by side), etc. (Fig. 1). The proposed exercises were used at each training lesson in the preparatory and main parts. In the

preparatory part - general training exercises, in the main part - exercises related to techniques. The total number of training classes per week of the control and experimental groups was four for 90 minutes.

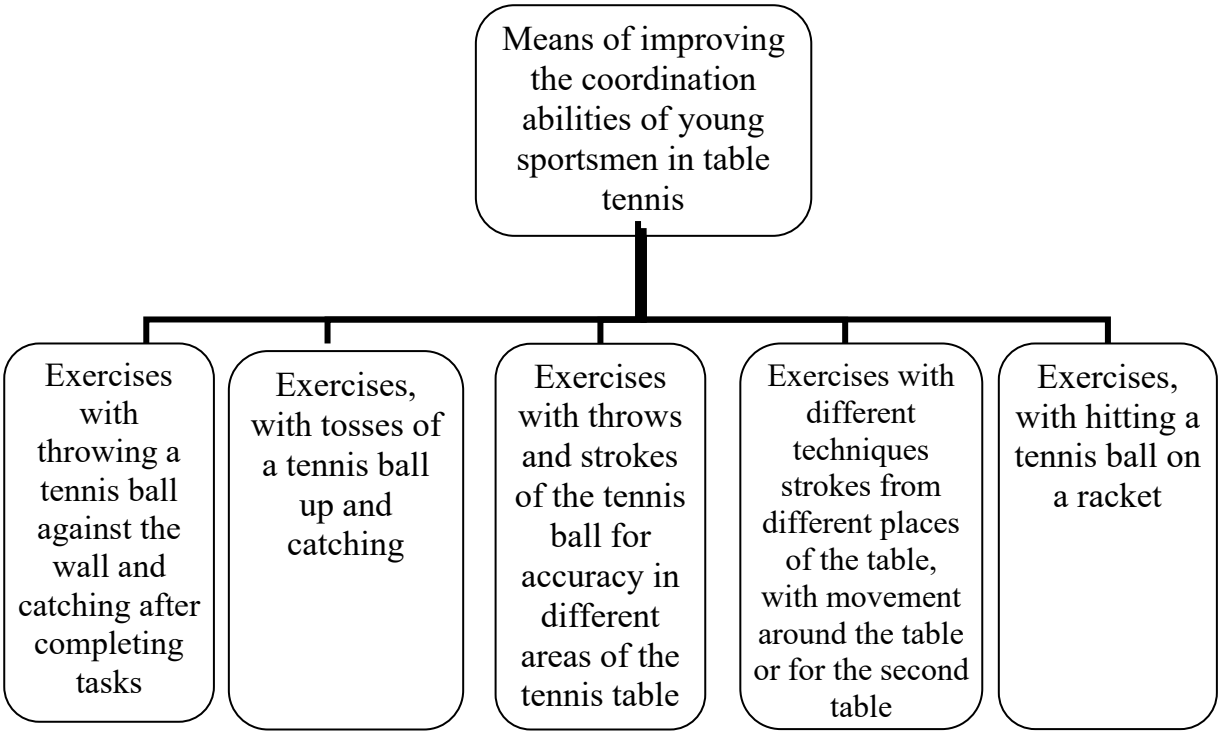

Figure 1. Means of improving the coordination abilities of 8-9-year-old sportsmen in table tennis

The Microsoft Excel application package was used to analyze the obtained information, the validity of the discrepancies was established based on the calculation of the Student criterion, at $p<0,05$.

Results of the research

At the beginning of the pedagogical experiment, the control and experimental groups probably didn't differ from each other in all indicators of testing the manifestation of coordination abilities (Table 1).

Table 1

The comparison of indicators of coordination abilities of 8-9-year-old tennis players of experimental and control groups before the pedagogical experiment

Tests		Indicators $\overline{X} \pm m$			
		EG(n=12)	CG(n=12)	t	p
Hitting a tennis ball on a racket for 1 min. (times)	on the inside of the racket	25,7±2,3	25,4±2,1	0,10	>0,05
	on the outside of the racket	12,8±1,1	12,1±1,7	0,35	>0,05
	on the inside and outside of the racket alternating	10,5±1,5	9,9±1,9	0,25	>0,05
Tossing and catching a tennis ball with two hands no higher than the head for 30 s (times)		9,1±0,2	9,6±0,3	1,39	>0,05
Run sideways around the table (s)		29,2±0,6	29,1±0,7	0,11	>0,05
Running in the eight (s)		36,3±0,5	37,0±0,6	0,90	>0,05
Transfer of balls while moving in a 3-meter zone (s)		48,4±0,3	48,9±0,4	1,00	>0,05

After the experiment, comparing the test results in the experimental group, a reliable improvement in the results of the tests was revealed: hitting a tennis ball on a racket for 1 minute on the inside and the outside of the racket and alternating the side of the racket, run sideways around the table, running in the eight ($p<0,05$). The probable difference wasn't found ($p>0,05$) in the tests - tossing and catching a tennis ball with two hands for 30 s, transferring the balls while moving in a 3-meter zone. The results are shown in Table 2.

Table 2

Indicators of the development of coordination abilities of 8-9-year-old tennis players of the experimental group before and after the pedagogical experiment

Tests		Indicators $\overline{X} \pm m$			
		Before the experiment (n=12)	After the experiment (n=12)	t	p
Hitting a tennis ball on a racket for 1 min. (times)	on the inside of the racket	25,7±2,3	32,2±2,1	2,09	<0,05
	on the outside of the racket	12,8±1,1	16,3±1,2	2,15	<0,05
	on the inside and outside of the racket alternating	10,5±1,5	14,6±1,3	2,07	<0,05
Tossing and catching a tennis ball with two hands no higher than the head for 30 s (times)		9,1±0,2	9,6±0,3	1,39	>0,05
Run sideways around the table (s)		29,2±0,6	27,5±0,5	2,18	<0,05
Running in the eight (s)		36,3±0,5	35,4±0,7	2,09	<0,05
Transfer of balls while moving in a 3-meter zone (s)		48,4±0,3	47,1±0,7	1,79	>0,05

The improvement in the manifestation of coordination abilities in 8-9-year-old children of the experimental group who are engaged in table tennis was: in the tests “Hitting a tennis ball on a racket for 1 minute on the inside of the racket” - by 25,3%, “Hitting a tennis ball on a racket for 1 minute on the outside of the racket” - by 27,3%, “Hitting a tennis ball on a racket for 1 minute on the inside and the outside of the racket alternating” - by 39,0%, “Tossing and catching a tennis ball with two hands no higher than the head in 30 s” - by 5,5%, “Run sideways around the table” - by 5,8%, “Running in the eight” - by 2,5%, “Transfer of balls while moving in a 3-meter zone” - by 2,7% (Fig. 2).

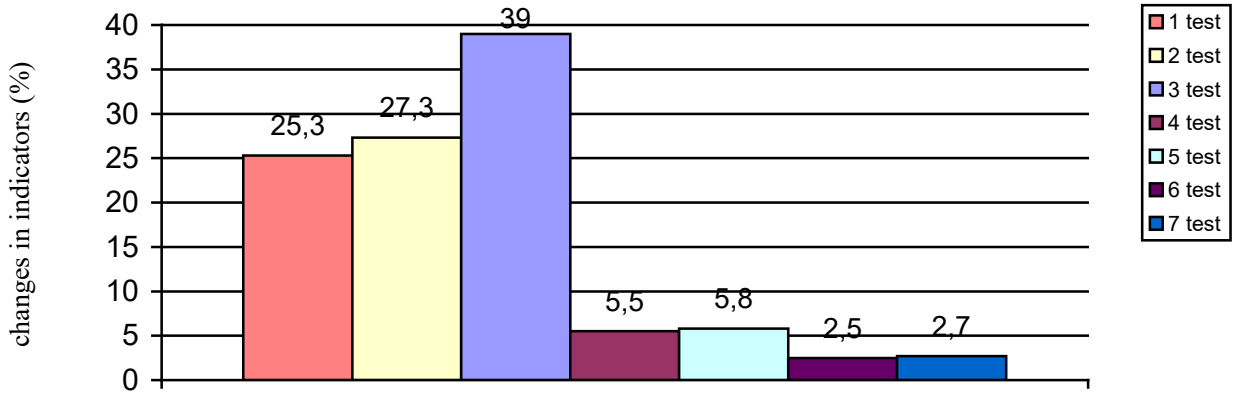

Figure 2. Qualitative indicators of changes in the manifestation of the coordination abilities of 8-9-year-old tennis players of the experimental group after the pedagogical experiment (percentages):

Test 1 - Hitting a tennis ball on a racket for 1 minute on the inside of the racket; Test 2 - Hitting a tennis ball on a racket for 1 minute on the outside of the racket; Test 3 - Hitting a tennis ball on a racket for 1 minute on the inside and the outside of the racket alternating; Test 4 - Tossing and catching a tennis ball with two hands no higher than the head in 30 s; Test 5 - Run sideways around the table; Test 6 - Running in the eight; Test 7 - Transfer of balls while moving in a 3-meter zone

It should be noted that the greatest changes in indicators of the manifestation of coordination abilities of young sportsmen of the experimental group occurred in test exercises related to hitting a tennis ball on a racket.

Conclusions / Discussion

Our research was carried out in the context of recommendations of other specialists on the need to maintain and to increase the level of physical fitness of young sportsmen, especially coordination abilities, which are the basis for mastering

the techniques. The authors Cherniaiev A. A. and Paikov M. B. proposed the methodology for developing the coordination abilities of young sportsmen in table tennis in the preparatory period, which consisted of 3 different sets of exercises that had a certain orientation. The authors selected additional exercises with and without a tennis racket and a ball, which allowed for 9 training microcycles to improve significantly the physical fitness of tennis players ($p<0,05$) [17]. Drobysh A. S. selected exercises aimed at developing the coordination abilities of 10-12-year-old young sportsmen who were engaged in table tennis. The main methodological technique in the development of coordination abilities by the author was the presence of a complication in the performance of exercises, which were implemented due to an increase in the number of used items. At the same time, the greatest increases in indicators of coordination abilities by the author were noted in the test “Flamingo” by 53,8%, in the test “Shuttle Run 3x10 m” by 4% [3]. Shyian V. M. noted that during the research, 12-14-year-old badminton players received naturally more significant individual absolute indicators of coordination abilities, compared with the average values of children of a certain age [19].

Results of our research continue several works on study and improvement of the process of development of coordination abilities of young sportsmen. The obtained results of our research are consistent with those of other researchers [4, 6, 15]. The authors note that regular table tennis classes, the use of exercises with a tennis ball and a racket positively affect the manifestation of coordination abilities [9, 13].

So, the developed by us system of selected exercises with a tennis ball improved the indicators of manifestation of coordination abilities of 8-9-year-old young pupils of the experimental group of the sports school who are engaged in table tennis. This is expressed in a reliable improvement in the results of the tests: hitting a tennis ball on a racket for 1 minute on the racket, on the inside and the outside of the racket and alternating the side of the racket, run sideways around the table, running along the eight ($p<0,05$). The results of our research allow us to recommend that coaches supplement the training process of table tennis groups with a system of

specially selected ball exercises to improve the manifestation of coordination abilities.

Prospects for further research. We see the influence of indicators of coordination abilities on the level of technical and tactical training of tennis players in the research.

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