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Original Article

Improvement of tactical action in the attack of handball players at the stage of preparation for higher achievements

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Abstract. In this work decided scientific and methodological tasks of improvement of attacking tactical actions of handball players at stage of preparation for higher achievements.
The study for the first time justifies tactical training program that is aimed at improvement of tactical actions during attack of handball players at stage of preparation for higher achievements by improving group interaction and also defined ways of components of heterochrony of tactical actions during attack of handball players at stage of preparation for higher achievement improvement.
Improvement of tactical training of handball players at stage of preparation for higher achievements in the part of attacking tactical actions was improved on the background of maintaining the level of technical readiness of the majority of indicators: shots from long distances, shots from comfortable edge position, shots from close distance after passing, shots from close distance (accuracy), shots from close distance, ball passing to the center line.
Key words: tactical action, players, handball.

Introduction

Stage of preparation for higher achievements (PHA) is the transfer stage from youth sport to participation in the competition in adults teams and has a number of distinctive features: participation in systematic competitions, adaptation to new conditions of competitive activity, increased requirements for training and compliance levels of team skills (Briskin, Ostrovs'kyy, 2015; Doroshenko, Zapenko, 2007).

This leads to the need of new ways for improvement of handball players training that will meet modern conditions of competitive activity. Experts see reserves for that in improvement in those aspects of handball training which are crucial at exact stage of long-term training (Frolova, 2013; Briskin 2014; Galan, 2016).

At stage of preparation for higher achievements against the high level of physical and technical preparedness of handball players leading role in sport performance plays tactical preparedness and features of its implementation in competitive activity (Khimenes, 2016; Karatnyk, 2015).

A small part of handball experts directed their research for tactical thinking study (Tyshchenko, 2014, Ignatieva, 2005), improvement of technical and tactical actions of handball players (Romanchyshyn, 2015), characteristics of handball tactics in general (Platonov, 2004).

Thus, the existing contradiction between the need of tactical action in attack improvement of competitive activity of handball players at stage of preparation for higher achievements and the lack of its proper scientific and methodical justification leads to relevant scientific and practical task of tactical actions in attack improvement.

Aim of the research: to improve the effectiveness of tactical action in attack of handball players in competitive activity at stage of preparation for higher achievements by improving group interactions.

Organization of the research

On the first stage of the study was conducted pedagogical observation of handball players' competitive activity at stage of preparation for higher achievements. For this process were taken 28 games of official competition from championship of Ukraine calendar of the handball major league. Developed plan of pedagogical experiment with use of authorial program of tactical action in attack of handball players improvement at stage of preparation for higher achievements.

On the second stage of the study conducted pedagogical experiment in natural conditions of training and competitive process of handball players at stage of preparation for the higher achievements of the team "KDUSH-LSUPC-Politechic" (Lviv, Ukraine). Were discussed main results of pedagogical experiment. Were overviewed all results of the research.

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Methods: theoretical analysis and synthesis, analysis of documentary materials, pedagogical observation, pedagogical experiment, methods of mathematical statistics.

Results

An important part of sportsmen training that mostly determines the overall sportsmen result in handball competitive activity is the number and effectiveness of tactical actions in attack.

Theoretically justified authorial program of improvement of tactical actions in attack of handball players at stage of preparation for higher achievements required validation in natural conditions of training process.

With this aim we conducted pedagogical experiment involving handball players at appropriate stage of long-term training process. According to scientific and methodological literature found that at stage of preparation for higher achievements there are significant differences in methodological approaches of specialists for tactical training.

The need for objective discussion of main results of the study indicated the ability of results comparison only in optimal similar conditions of qualified handball players training process. Therefore, in our study compared the data set that was obtained during several training macrocycles, including their competitive period.

Under the proposed by us sequence let's turn our attention to the first group of tactical actions of handball players in attack indicators at stage of preparation for higher achievements and their dynamics during the study.

According to the results it can be affirmed that by indicator of total number of shots on opponents goal was no significant changes at any of the study stages (0,68–1,56 shots, 1,06–2,43% with $p>0,05$). This indicates that regardless of the impact of the training this indicator has constant signs (Table 1).

Table 1

Dynamics of tactical actions in attack indicators of different types of handball players at stage of preparation for higher achievements during the study

Indicato	Training macrocycles (years)			Differences between indicators of handball players at different stages of the research		
	2009–2010 (1)	2011–2012 (2)	2012–2013 (3)	1-2 absolute value	1-3 absolute value	2-3 absolute value
	M±m	M±m	M±m	(%)	(%)	(%)
1	64,07±4,37	65,63±3,91	64,75±3,34	1,56 (2,43)	0,68 (1,06)	-0,88 (1,33)
2	29,04±4,97	28,54±3,25	31,06±4,18	-0,50 (1,72)	**2,02* (6,96)**	**2,52* (8,83)**
3	40,20±5,79	44,96±5,53	47,69±5,95	2,73 (6,07)	**4,76* (10,58)**	**7,49* (18,62)**
4	46,75±4,79	52,88±3,22	49,00±3,25	**6,13* (13,10)**	2,25 (4,81)	3,88 (7,33)
5	16,14±4,58	17,33±2,67	19,31±2,69	1,19 (7,39)	**3,17* (19,66)**	**1,98* (11,42)**
6	33,83±6,91	32,96±5,47	39,65±5,74	-0,87 (2,56)	**5,82* (17,19)**	**6,68* (20,28)**
7	8,82±2,19	7,75±1,67	9,25±1,97	-1,07 (12,13)	0,43 (4,88)	**1,50* (19,35)**
8	5,57±1,22	3,21±1,26	4,31±1,27	**-2,36** (42,40)**	**-1,26* (22,58)**	**1,10* (34,42)**
9	66,62±15,14	39,62±10,01	46,06±7,02	**-27,00** (40,53)**	**-20,56** (30,86)**	**6,44* (16,26)**
10	8,50±1,89	5,04±1,80	7,13±1,89	**-3,46** (40,69)**	-1,38 (16,18)	**2,08** (41,32)**
11	5,50±1,07	3,88±1,47	5,56±1,74	**-1,63* (29,55)**	0,06 (1,14)	**1,69** (43,55)**
12	66,7±10,75	75,98±10,30	75,74±9,34	**9,28* (13,91)**	**9,04* (13,56)**	-0,23 (0,30)

Notices: 1 – total amount of shots per game; 2 – amount of goals per game; 3 – effectiveness of shots per game; 4 – total amount of shots per game after positional attack; 5 – amount of goals per game after positional attack; 6 – effectiveness of shots per game after positional attack; 7 – total amount of shots per game after breakthrough; 8 – amount of goals per game after breakthrough; 9 – effectiveness of shots per game after breakthrough; 10 – total amount of shots per game after wing; 11 – amount of goals per game after wing; 12 – effectiveness of shots per game after wing; * – $p\leq0,05$; ** – $p\leq0,01$.

Along with that by other summarized indicators of attack tactical actions are positive changes. After use of the authorial program of tactical training with emphasis on the implementation of group interactions including the option of combined tactical actions can be seen significant improvement of effectiveness of shots per game indicator on the second training macrocycle example. In the first season (2011–2012) total team indicator slightly decreased to 28,54±3,35 of effectiveness of shots per game. This worsened on 0,50 shot the initial rate (1,72 with $p>0,05$). These trends have changed in the second training macrocycle where indicator of effectiveness of shots per game significantly increased to 31,06±4,18 shots per game, on 2,02–2,52 (6,96-8,83% with $p\leq0,05$) compared to the initial indicators and the first pedagogical experiment macrocycle.

Was identical situation with the total amount of effectiveness of shots in competitive activity of handball players at stage of preparation for higher achievements. In this case during the first macrocycle was a slight decline in the indicator of effectiveness of shots on 2,73 (6,07% with $p>0,05$). However, after the second year of our proposed program use indicator not only returned to the previous one, but significantly increased in comparison with the control competitive season (2009–2010).

Thus the analysis of other indicators of tactical actions in attack was carried out to determine the main components that form the total sport result that allowed sportsmen to demonstrate sufficiently high level of readiness during pedagogical experiment.

Note that by indicators total amount of shots after positional attack occurs undulating dynamics. Thus, in the first year of pedagogical experiment total team indicator was 52,88±3,22 shots per game, which compared to control indicators are significantly more (6,13 shot, 13,10%, with p≤0,05). Following the second year of pedagogical experiment there is the alignment of this indicator.

By the total number of effectiveness of shots indicator using the authorial tactical training program indicators were improved already at the first stage of pedagogical experiment. Besides this improvements further gained positive dynamics. Thus, in season 2011-2012 representatives of team "CDUSH-LSUPC-Politechnic" performed an average of 17,33 effectiveness of shots after tactical actions in positional attack, which is on 1,19 (7,39% with p>0,05) more than on the control period of the study. In the 2012-2013 season value of this indicator gained significant positive level compared to the two previous periods. The benefit at level 1,98-3,17 of effectiveness of shot (11,42-19,66% with p≤0,05). Such indicators results could not effect on the total result of effectiveness of shots after tactical actions in positional attack. However, in the season 2009-2010 and 2011-2012 value of effectiveness of shots after positional attack had no significant differences (0,87% absolute value, 2,56% relative value with p>0,05). After two years of authors program realization was managed significant improvement of effectiveness of shots indicator compared to two previous periods of the study (on 5,82-6,6, 17,19-20,28%, p≤0,05). This is an example that shows the effectiveness of the authorial program, because for the consideration of between qualification differences highest were noted in the effectiveness of shots after various options of attacking action.

In the structure of shots has increased indicator of the amount of shots in attack after positional attack at a relatively constant number of total shots. This is possible only through the organization of other types of attack, including breakthrough and wing. In support of this we recorded decrease in the first training macrocycle, implemented with use of the authorial improvement program of tactical action in attack (-3,46 shot, 40,69% at p≤0,01). However, in the second macrocycle (season 2012-2013) value of this indicator has almost recovered to 7,13±1,89 shots per game. Similar dynamics recorded for the number of effectiveness of shots after wing. Controls and final indicators in the preparation macrocycle (seasons 2009-2010 and 2012-2013 respectively) had no significant difference (0,06 shots, 1,14% with p>0,05). Reducing the number of effectiveness of shots was observed in the first stage of pedagogical experiment. Indicators of effectiveness of shots after wing were significant lower than in two other study periods on 1,63-1,69 shots (29,55-43,55% with p≤0,05-0,01).

Along with that, by one more result meaningful indicator of technical and tactical training realization of handball players that is success of shots (Perederiy, 2016; Melnyk, 2015). According to this indicator was recorded increase since the first stage of the pedagogical experiment (season 2011-2012.) and its further stabilization in conditions of significant increase of shots amount. Overall benefits of the two periods of study of the pedagogical experiment by indicator shots after wing was 9,28% (13,91% with p≤0,05) and 9,04% (13,56% with p≤0,05) compared to initial indicators of season 2009-2010.

The study of structure of changes in indicators of group tactical actions in attack varieties allowed to establish the following (Table 2). Total of the number of shots performed after the parallel group interactions have undergone significant changes after the first period of its use (training macrocycle, season 2011-2012).

Table 2

Dynamics of indicators of different varieties of group of tactical actions in attack of handball players at stage of preparation for higher achievements during the study

Indicato	Training macrocycles (years)			Differences between indicators of handball players at different stages of the research		
	2009–2010 (1)	2011–2012 (2)	2012–2013 (3)	1-2 absolute value (%)	1-3 absolute value (%)	2-3 absolute value (%)
	M±m	M±m	M±m			
1	17,07±2,16	23,42±2,45	20,63±2,50	**6,35** (37,18)**	**3,56* (20,83)**	-2,79 (11,92)
2	6,71±1,38	9,54±1,78	8,81±1,31	**2,83** (42,20)**	**2,10* (31,33)**	-0,73 (7,64)
3	39,72±7,40	40,72±6,43	42,92±4,94	1,00 (2,51)	3,20 (8,07)	2,21 (5,42)
4	15,96±1,61	16,04±3,13	15,63±2,33	0,08 (0,51)	0,34 (2,10)	0,42 (2,60)
5	6,36±1,77	5,33±1,58	5,94±0,95	**-1,03* (16,14)**	-0,42 (6,64)	0,60 (11,33)
6	39,81±10,20	32,87±5,92	38,46±6,13	**-6,94* (17,44)**	-1,35 (3,40)	**5,59* (17,01)**
7	18,07±2,64	17,21±2,13	20,00±3,38	-0,86 (4,77)	1,93 (10,68)	**2,79* (16,22)**
8	7,07±2,52	6,13±1,65	10,31±2,40	-0,95 (13,37)	**3,24** (45,86)**	**4,19** (68,37)**
9	38,53±10,78	35,65±8,90	51,59±10,27	-2,88 (7,47)	**13,06** (33,90)**	**15,94** (44,72)**

Notices: 1 – total amount of shots per game after parallel group tactical action in attack; 2 – amount of goals per game after parallel group tactical action in attack; 3 – effectiveness of shots per game after parallel group tactical action in attack; 4 – total amount of shots per game after crossed group tactical action in attack; 5 – amount of goals per game after crossed group tactical action in attack; 6 – effectiveness of shots per game after crossed group tactical action in attack; 7 – total amount of shots per game after combined group tactical action in attack; 8 – amount of goals per game after combined group tactical action in attack; 9 – effectiveness of shots per game after combined group tactical action in attack; * – p≤0,05; ** – p≤0,01.

During this stage of pedagogical experiment increase of the number of shots was 6,35 shots (37,18% with p≤0,01). Later (in the second stage) slightly decreased, providing general advantage of the experimental program at level of 3,56 shots (20,83% with p≤0,05). Similar trends were observed in the analysis of the amount of goals scored in opponent's goal. Use of the authorial program made significant operational growth in the amount of effective shots after parallel group interactions in the attack to 9,54 ± 1,78, that is on 2,83 shots, 42,20% more than initial indicators. During the second stage of pedagogical experiment average indicators of shots effectiveness slightly decreased and were 8,81±1,31 shots, that is on 2,10 shots, 31,33% with p≤0,05 more than at initial level of tactical training. With positive changes for the two indicators, significant increase in the indicator of shots effectiveness after parallel group interactions has not occurred. Effectiveness indicators for all period of study (2009-2013) remained relatively constant.

For crossed group tactical actions in attack there is another situation. Use of the authorial program did not provided any proper and justified technical training progress by implementation of the program at various stages of pedagogical experiment. For indicator of total amount of shots after crossed group interactions were not revealed any significant changes, indicators fluctuated within 15,63-16,04 shots per game (p>0,05). Sudden were indicators of shots effectiveness and total effectiveness after crossed group interactions. Thus, in both cases was recorded a significant decrease at the first stage using authorial program (1,03 shots, 16,14% and 6,94%, 17,44% respectively with p≤0,05). Only after the second stage of pedagogical experiment situation was equal and indicators returned to initial level (p>0,05).

Thus, training tasks which were contributed for improvement of the other group interactions have changed their emphasis in training. This in turn has helped to increase tactical arsenal of qualified handball players, because crossed group interactions were dominant in the structure of their competitive activity.

According to the last variety of tactical group interactions set slight increase in the amount of shots after combined group interaction to the level of 20,00±3,38 shots per game, which is on 1,93-2,79 shots (10,68-16,22%) higher compared with indicators of other research stages. However, by indicators of effective shots after combined group interactions and effectiveness of shots is seen significant growth.

As addition for information above we see the definition of structure and location of shots in competitive activity of handball players at stage of preparation for higher achievements.

It is established that by the amount of shots from the line indicator did not have any significant changes. During all periods of study and participation in competitions indicator fluctuated between 8,96-10,36 shots with p>0,05. The difference between indicators was within the range of 0,48 to 1,40%. Different situation was with indicator of amount of effective shots from the line. Implementation and realization of the authorial program of tactical action in attack improvement resulted in period of adaptation to new methodological approaches in the training process (first stage 2011-2012.) significant decrease of this indicator to 6,21 effective shots per game (1,61 shots, 20,61% with p≤0,05). This indicates that qualified handball players at stage of preparation for higher achievements were not able for immediate restructuration of structure of their tactical action in attack and used more efforts for quality implementation of tactical attack actions that reduced the concentration of sportsmen in shot performance. That means that the importance of implementing of coach tactical installations came in first place for sportsmen and they believed that performance of tactical action in attack were main aim. Along with that, during the second stage of pedagogical experiment (training macrocycle, season 2012-2013) using the program once more it was able to solve problems in the final phase of the attack. In season 2012-2013 handball players at stage of preparation for higher achievements have increased the rate of effective shots from the line to 7,44 ± 2,94, exceeding the level of the previous season on 1,23 shots (19,80%) and turned them into zone of optimal results.

Indicators of total amount of shots from line and effective once have created similar to the previous situation with total effectiveness.

Another important component of the structure of competitive activity of handball players of different qualification is shots from the back line. According to information received during pedagogical experiment and comparing them with the initial was set that sportsmen significant (p>0,05) use less of the following shots during the game. Indicators on two stages of pedagogical experiment were 45,88 and 45,25 shots per game. The differences between the indicators in different periods were within 0,63-1,89 shot (1,36-4,01%).

Along with that, by the amount of effective shots there is a similar situation characterized by many indicators of tactical actions in attack that have already been considered. Thus, after the implementation of the authorial program was a slight decrease of the indicator (on 0,68 shot, 4,71% with p>0,05). Following two stages of pedagogical experiment there is a significant growth in the indicator of the amount of effective shots from the back line to 16,94±1,57 shots. It was possible to create an advantage over previous indicators at previous stages of the study, it was 2,51 effective shots, 17,38% with p≤0,05 (compared to the 2009-2010 season) and 3,19, 23,18 with p≤0,01 (compared to the 2011-2012 season).

Received data allowed to affirm that for effective change in tactical action in attack on certain indicators that would approaching by its values to stage of maximum realization of individual abilities are necessary two annual training macrocycle. In support of this let's consider the indicator of shots from the back line. Note that this group of shots has the largest share of shots in the result of competitive activity of sportsmen of different

qualification. Over the productivity of shots from the back line recorded significant improvement after the second stage of pedagogical experiment (37,54±3,91%). Compared to the first and second stages of the study was within 7,09-7,49% with p≤0,01.

Note that the contribution of this variety of shots localization allowed compensating other trends that observed during analysis of the data. For shots from the edges with relatively stable indicators of total amount of shots on goal (6,71-7,92 shots with p>0,05) and effective once (4,46-4,96 shots with p>0,05) for the entire period of study recorded significant differences in direction to the decrease in indicator shots from the edges. During the first stage of pedagogical experiment this value decreased by 18,45% (p≤0,01) and the second phase – 12,63% (p≤0,05) compared to initial indicators values. However, there is an improvement of the indicator in the second period of pedagogical experiment compared with the first and points on the course of adaptation process and also on our opinion probably will return performance to the initial level or even exceeding it in terms of the implementation of authorial program for a longer period of pedagogical experiment. This can also be corrected using our developed program of improving tactical action in attack by this indicator that can be our prospect of further research.

As expected for 7-meter shots on goal in competitive activity of handball players at stage of preparation for higher achievements does not have significant changes.

Received data about shots from 7-meter line were quite expected. According to a large number of specialists this shot has standard performance conditions, but puts high demands on the emotional state of the sportsmen and his technical and tactical training. Some handball specialists indicate that the performance of 7 meter shots should be seen as a "sports lottery". It also gives ability to affirm that a set of preparatory actions and performance factors are relatively constant that is the basis for insignificant fluctuations of the indicator of 7-meter line shots in competitive activity of handball players at stage of preparation for higher achievements at all study periods.

Objective relationships that exist between the technical and tactical preparedness of sportsmen in handball indicate the need to study these indicators together. Despite the fact that the authorial program of tactical actions in attack had no changes aimed at correcting the level of technical training we decided to study the dynamics of technical preparedness by major efficiently and meaningful indicators (shots and passing) for the period of the study.

Characteristic features of the organization of the research and pedagogical experiment indicated the need to study the indicators of technical training in the same training macrocycle which were for testing of the authorial program for improvement of tactical action in attack efficiency. Thus, was done analysis of technical preparedness indicators of handball players at stage of preparation for higher achievements in major efficiently and meaningful elements (shots and passing) and was made their comparison in different control sections (Table 3).

Table 3

Indicators of technical preparedness of handball players at stage of preparation for higher achievements during the study

	Training macrocycles					
	2009–2010 years		2011–2012 years		2012–2013 years	
	Beginning	Ending	Beginning	Ending	Beginning	Ending
	M±m	M±m	M±m	M±m	M±m	M±m
*	*1*	*2*	*3*	*4*	*5*	*6*
1	10,29±0,90	10,14±0,90	10,21±0,96	10,43±0,78	10,29±1,04	10,71±0,76
2	4,93±0,53	5,07±0,53	4,93±0,52	5,00±0,43	5,00±0,57	5,43±0,57
3	3,79±0,56 [5]	3,43±0,92 [6]	3,71±0,76 [5]	3,57±0,92	3,00±0,86 [1,3,6]	4,21±0,93 [2,5]
4	7,86±0,63	7,79±0,70	7,86±0,78	8,21±0,56	8,14±0,49	8,20±0,52
5	7,43±0,80 [2]	8,14±0,49 [1]	8,00±0,57	8,36±0,55	7,86±0,61	8,35±0,59
6	39,36±1,27 [2]	38,36±0,93 [1]	38,64±0,93	38,07±0,81	38,93±1,36	37,71±0,90
7	20,14±1,18	20,29±1,29 [6]	20,28±1,27	20,43±0,92 [6]	21,00±1,00	21,50±0,93 [2,4]
8	18,21±0,96 [3]	18,64±0,93	19,07±0,94 [1,4]	18,14±0,76 [3]	19,00±1,01 [6]	18,07±0,53 [5]
9	7,57±0,78 [5]	7,93±0,53	8,07±0,66	8,00±0,86	8,21±0,67 [1]	8,29±0,61

Notices: * – control exercises for technical preparedness: 1. shots from long distances; 2. shots from comfort edge positions; 3. shots from uncomfortable edge positions; 4. shots from close distances after pass; 5. shots from close distances (accuracy); 6. shots from close distances (time); 7. ball passing for 30 seconds; 8. ball passing to central line; 9. ball passing on long distances; [1] – significant differences with indicators on 2009-2010 season beginning; [2] – significant differences with indicators on 2009-2010 season ending; [3] – significant differences with indicators on 2011-2012 season beginning; [4] – significant differences with indicators on 2011-2012 season ending; [5] – significant differences with indicators on 2012-2013 season beginning; [6] – significant differences with indicators on 2012-2013 season ending

Note that by indicators of control exercise "Shots from long distance" found that despite the long period of the study and variable composition of sportsmen contingent results were relatively stable (p>0,05) and ranged from 10,14±0,90 accurate shots (end of 2009-2010season) to 10,71±0,76 accurate shots (end of season 2012-2013).

A similar situation exists with the results of control exercise "shots from comfort edge positions". Indicators of this exercise ranged from 4,93±0,53 of accurate shots (beginning of 2009-2010season) to 5,43±0,57 accurate shots (end of 2012-2013season). Thus by the results of exercise performance that is similar by structure and content from uncomfortable edge for sportsmen there is observed significant differences during the study period (p≤0,05). According to this control exercises was recorded that early in the season 2012-2013 handball players at stage of preparation for higher achievements that were part of the teams "CDUSH-LSUPC-Politechnic" significantly lower results in this control exercises. So on this control section indicators of this group of sportsmen inferior to those established at the beginning of season 2009-2010 (0,79 shots, 26.33%) and 2011-2012 (0,71 shots, 23.66%) and at the end of season 2012-2013 (1,21 shots, 40.33%). Also average group indicator recorded at the end of the study at the last test of the season 2012-2013 was significant higher than at the final indicators of the season 2009-2010 on 0,78 shots, 22.74% with p≤0,05.

By one more control exercise throughout the period of pedagogical research was not recorded any significant changes including "shots from close distances after pass" For this control exercise average indicator ranged from 7,79±0,63, to 8,21±0,56 shots.

The following indicators of technical readiness are related with the performance of control exercise shots from close distances (accuracy). They are presented by quality indicator of performance (accuracy) and quantitative indicator (exercise duration). Both these indicators recorded similar trends. Significant differences were observed only in the first period for which was conducted the study of technical training level. In both cases, these indicators have got improved (p≤0,05). Amount of accurate shots increased from average group values 7,43 to 8,14 shots, on 9,55%. In all next sections control sections indicators were stable (7,86-8,36 shot with p≤0,05). By the time that sportsmen used for this exercise performance were changes in the first training macrocycle (season 2009-2010) and were 1,00 sec.

The results of the control exercises related to maximum amount of ball passes for 30 seconds at a distance of 6 meters found the highest indicators at the final control section (end of season 2012-2013) 21,50±0,93 passes. This is significantly higher (p≤0,05) from indicators at separate control sections (end of season 2009-2010 and 2011-2012). The advantage over them was 1,21 and 1,22 shots (5,96 and 6,01% respectively).

Most multi-directional test results we received by control exercise "ball passing to central line" Average group results had significant fluctuations during all study periods. Firstly, note increase from the first control section (the beginning of the 2009-2010 season) to the third control section (the beginning of the season 2011-2012) from 18,21 to 19,07 shots with p≤0,05. In the future, there is a reliable decline to 18,14 (end of season 2011-2012) and increase to 19,00 shots (the beginning of the season 2012-2013).

Significant changes throughout all study periods were recorded in indicators of control exercise "ball passing on long distances" However, they have reached significant values only at the last stage of pedagogical experiment (season 2012-2013) in comparison to the initial data (the beginning of the season 2009-2010). The advantage reached 8,21 shots against 7,57 with p≤0.05.

Thus, despite some positive changes and variability of technical readiness indicators can be affirmed that essentially they were unable to influence on the effectiveness of the authorial program. We believe they provided necessary conditions for the objective determination of the effect of experimental factors.

Discussion

According to the research indicators of team attack tactical action can be stated significant improvements on effectiveness of shots in positional attack and after wing which is consistent with needed trends of handball players' excellence established on the example of high qualified sportsmen. But there are significantly lower indicators of breakthrough that require correction for optimal level of their implementation, despite the objectively smaller share in the structure of effective shots of high qualified handball players on stage of maximal realization of individual abilities.

Note that achieving significant growth of indicators of combined group tactical interaction achieved with implementing a two-year authorial program of tactical action in attack improvement. During the first stage of pedagogical experiment these indicators had fluctuations in different directions (6,13-7,07 shot and 35,65-38,53% with p> 0,05). At the end of the second training macrocycle in which was also implemented authorial program indicators significantly increased to 10,31±2,40 of effective shots per game and 51,59% of effectiveness in competitive activity. This is on 3,24-4,19 effective shots and 13,06-15,94% more compared to other study periods. Also, note that the higher amount and quality of shots performance (by effectiveness) is characteristic for high qualified handball players at stage of maximal realization of individual abilities. It can be affirmed that the use of authorial training program and its testing in the training process of handball players at stage of preparation for higher achievements helped to induce efficient adaptation process regarding to tactical training. This shows on solving the major tasks that we put in the pedagogical experiment.

Analysis of shots localization in competitive activity of handball players at stage of preparation for higher achievements and their features at different stages of the study revealed that the main share of shots that provides sports results are made from the back line. The findings point on the advantages of the authorial program of tactic actions in attack improvement on the basic of efficiently and meaningful indicators: number of performed shots from line and their effectiveness, number of performed shots from back line and their effectiveness. Also for experimental program noted achievement of reliable efficiency in some cases over a prolonged period of use. This indicates that in the case of tactical training should not be expected rapid achievement of the results for all indicators, for some of them must be a period which in our study made two annual training macrocycle. Scientific information related to the effectiveness of shots from edge pointed the need for further research that could be the basis for a separate study.

Note that changes in the attack tactical actions of handball players at stage of preparation for higher achievements have occurred on maintaining and in some cases improving technical training.

Conclusion

The effectiveness of the authorial program of tactical action in attack improvement of handball players at stage of preparation for higher achievements was established on the basis of significant positive change ($p \leq 0,05$-$0,01$) for indicators: total amount of shots per game: after group action in attack (10,06%), after parallel group tactical actions in attack (20,83%); number of scored: per game (6,96%), after positional attack (19,66%), after wing (13,56%), after group tactical action in attack (24,44%), after parallel and combined group tactical actions in attack (31,33 and 45,86%), after shots from the back line (17,38%); effectiveness: per game (10,58%), after positional attack (17,19%); after wing (13,56%), after group tactical action in attack (13,07%); after combined group tactical actions in attack (33,90%), shots from the line (4,40%); from the back line (23,29%).

Improving tactical training of handball players at stage of preparation for higher achievements in part of tactical action in attack has been improvement with preservation of the background of technical training level through most indicators: ball passing from long distances, shots from comfort edge positions, shots from close distance after passing, shots from close distance (accuracy), shots from close distance (time), passing to center line, where frustrations were from -4.19 to 12.38% with $p>0,05$.

As for indicators shots from uncomfortable positions, ball passing for 30 seconds, passing on long distances under the influence of authorial training program for tactical action in attack improvement was observed significant positive changes (from 6,75 to 22,74% with $p \leq 0,05$).

For improvement of tactical readiness of handball players at stage of preparation for higher achievements using authorial training program with focus on improving the efficiency of combined group interactions set features for which indicators of the total amount of shots per game (total, after positional attack, after the group tactical cations in attack, after parallel group tactical cations in attack), amount of goals per game after parallel group tactical cations in attack and effectiveness of shots per game after wing can be corrected during the first years of training macrocycle.

For indicators of tactical readiness of tactical action in attack as amount of goals per game (total, after positional attack, after group tactical action in attack, after combined group tactical action in attack, from the back line) and effectiveness of shots per game (total, after positional attack, after group tactical action in attack, after combined group tactical action in attack, shots from the line, shots from the back line) are set training needs for prolonged exposure (for two annual training macrocycles).

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