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Improvement of Technical and Tactical Skills of 14–16 Years-Old Short Trackers

Martynenko I.V.
Russian State University of Physical Education, Sport, Youth and Tourism (State Central Order of Lenin Institute of Physical Education)
Moscow, Russia
w0102w@ya.ru

Oreshkina I.N.
Ural State University of Physical Education
Chelyabinsk, Russia,
gaika_ira@mail.ru

***Abstract*—The article is dedicated to the issue of improving technical and tactical preparedness of qualified short trackers in the training process of a competition period by increasing the number of exercises aimed at passing a turn; using ideomotor training exercises; practicing early acceleration when finishing a distance. The article considers the problem of theoretical and empirical studies absence regarding technical and tactical training of 14-16-years-old short trackers in a competition period.**

The pedagogical recommendations and results of technical and tactical preparedness before and after the experiment presented in the article are of practical importance for managing the training process of athletes, in particular short trackers of 14-16 years old. The obtained data are aimed at improving the efficiency of the training process and have a practical value for the study, which had a positive impact on the sports results, and therefore on improving sports and technical skills.

Keywords—short trackers; technical and tactical training; competition period; pedagogical recommendations.

I. INTRODUCTION

Technical and tactical training is an integral part of the qualified short trackers training process. It directly affects the achievement of high sports and technical results in a chosen kind of sport [4,7,8]. At each stage of the sportsmanship development, special attention should be paid to training and improving technical and tactical actions, since in short track it directly affects the outcome of the competition at a certain distance [6,10,21,22,23]. A competent use of technical and tactical methods in the process of competition activity by a short tracker allows him or her to get leading positions in a race followed by admission to the next round of competitions and entering not only the finals, but also a group of the three strongest award-winning athletes [9, 13, 14, 19]. The problem is that this issue is not sufficiently considered in theory and practice, but its solution will provide significant improvement of the athletic performance of 14-16-years-old short trackers.

The research topic under consideration is relevant for the modern short track and requires further study, and is based on a number of scientific papers [5, 15, 17, 20].

The purpose of this research is to increase the level of technical and tactical preparedness of qualified short trackers in a competition period, taking into account the developed pedagogical recommendations.

II. RESEARCH METHODOLOGY

The study was conducted in the city of Chelyabinsk on the basis of Municipal Budgetary Institution “Speed skating Olympic reserve school named after L.P. Skoblikova” and Ice Palace “Uralskaya molnija” from 2017 to 2019. 32 short-trackers having been involved in this kind of sport for 4-6 years took part in the study. The control group (CG) and experimental group (EG) included 16 athletes each, who had the sports ranks of candidates for master of sports.

The experimental technique is aimed at the formation of technical and tactical skills of short trackers of 14-16 years old by increasing the number of exercises aimed at passing a turn; using of ideomotor training exercises; practicing early acceleration when finishing. The training methodology aimed at improving the technical and tactical skills of qualified short trackers in a competition period is described in detail in the earlier scientific paper [11, 18].

During the experiment, the following pedagogical recommendations regarding the organization of short trackers training process were developed on the basis of many scientific studies [1, 2, 3, 12, 16]:

1. Before performing the exercises, the athletes should be divided into groups of 4 people working alternately. This will allow solving training problems in a quality manner; performing the tactics that are close to the competition conditions; controlling the quality and correctness of performing specific elements of the running technique.

2. Each group should include 1-2 athletes with a higher level of sportsmanship, better knowledge of the technique and

tactics of performing exercises that can be guiding. This peculiarity of the training process will allow applying an individual approach, as strong athletes will receive a greater load than the athletes which are in the end. In addition, the latter will see the correct execution of the technique, which will positively affect the training, reinforcement and improvement of special physical actions. The ability to build tactics with stronger short trackers will allow simulating competition situations, and, therefore, applying the developed tactics in races and getting leading positions.

3. In order to solve a specific tactical task, a variety of tactical tasks should be carried out both by a group and an individual athlete. It should be noted that such tasks are especially relevant before competitions, as this will allow creating the competition conditions, while reducing the intensity and amount of the load.

4. Performing exercises in pairs or following a guiding athlete should be accompanied by the methodical instructions, containing basic requirements for the technique of performing specific physical actions.

5. The attention of short trackers should be focused on the correct implementation of tactics or technical physical actions. It should be explained that with excessive muscle tension, fatigue stage and speed drop may occur quickly.

6. Technical and tactical preparedness of short trackers should become automatic thanks to multiple mental running the distances through modelling various running options.

III. RESULTS

The distances of 500 (4,5 circles), 1000 (9 circles) and 1500 m (13,5 circles) were divided into segments to determine technical and tactical preparedness of qualified short trackers in the control and experimental groups.

500 m distance: the first segment - starting acceleration (55-56 m) - characterizes the starting speed; the second and third segments (2 circles and 1 circle, respectively) - characterize the distance speed; the fourth segment - 1 circle - characterizes the acceleration at the finish circle. 1000 m distance: the first segment (1 circle) - characterizes the starting speed; the second and third segments (4 and 3 circles, respectively) - characterize the distance speed; the fourth segment (1 circle) - characterizes the acceleration at the finish circle. 1500 m distance: the first segment - starting acceleration (55, 56 m) - characterizes the starting speed; the second and third segment (8 and 4 circles, respectively) - characterize the distance speed; the fourth segment (1 circle) - characterizes the acceleration at the finish circle.

Tables 1 and 2 show the technical and tactical results of 14-16-years-old short trackers from the CG and EG before and after the experiment.

The technical result at a 1500 m distance in the CG was 2.29,0±1,0 s; the number of overtaking manoeuvres in a competition day at the same distance was 10, 3 of which were successful, the remaining 7 were unsuccessful. At the same time, while performing ideomotor training, short trackers showed the following results: a mental turn passing took 3,75±1,0 s, for the whole circle (111,12 m) the result was 10,1±3,0 s. Using video recordings of the races and electronic goniometer, the angle of an athlete's inclination to the bearing surface during the distance running was determined. In the CG it was 45±5 degrees. The ranking was 12±4. At a distance of 500 m, athletes from the CG showed the result of 43,9±0,5 s; the number of overtaking manoeuvres in a competition day was 6, only 2 of which were successful, the remaining 4 did not give a positive result and did not allow the athletes to take an advantageous position. In a test of ideomotor training at the same distance, a turn at maximum speed was performed in 2,75±1,0 s; 1 circle was completed in 10,0±3,0 s; the angle of inclination to the bearing surface slightly decreased: 40±5; the ranking was 14±2. At a distance of 1000 m, athletes showed the result of 1.33,5±0,7 s; the total number of overtaking manoeuvres was 8, 3 of which were successful, 5 were not successful. In an ideomotor test, the time of a turn passing with maximum speed was 2,76±1,0 s; the time for completing one circle was 10,0±3,0 s; the ranking was 15±4.

TABLE I. TECHNICAL AND TACTICAL RESULTS OF QUALIFIED SHORT TRACKERS BEFORE THE EXPERIMENT

Parameters	**Distance, m**					
	1500		***500***		***1000***	
	CG	***EG***	***CG***	***EG***	***CG***	***EG***
1 Time at a distance, min	149,0±1,0	149,8±0,8	43,9±0,5	43,7±0,6	93,5±0,7	94,0±0,8
1st segment time, s	10,7	10,7	7,0	6,9	12,3	12,4
2nd segment time, s	85,6	85,8	18,2	18,2	42,2	42,1
3rd segment time, s	42,2	42,8	9,2	9,2	28,8	29,2
4th segment time, s	10,5	10,6	9,5	9,4	10,2	10,3
2 Number of overtaking maneuvers in a competition day						
– total number	10	10	6	6	8	8
– successful	3	3	2	2	3	3
– unsuccessful	7	7	4	4	5	5
3 Inclination angle when passing a turn, degrees, degrees	45±5	45±5	40±5	40±5	40±5	40±5
4 Overall ranking	12±4	12±4	14±2	14±2	15±4	15±4
5 Mental passing a distance segment with maximum speed, s						
– turn	3,75±1,0	3,6 ±1,0	2,75±1,0	2,75±1,0	2,76±1,0	2,76±1,0
– 1 circle	10,1±3,0	10,7±3,0	10,0±3,0	10,0±3,0	10,0±3,0	10,0±3,0

The time of EG at a distance of 1500 m constituted 2.29,8±0,8 s; the number of overtaking manoeuvres was also 10, 3 of which were successful, the remaining 7 were not successful; a mental turn passing took 3,6±1,0 s, for the full circle the time constituted 10,7±3,0 s, the angle of inclination

of an athlete to the bearing surface was 45±5, the ranking was 12±4. At a distance of 500 m, the result was 43,7±0,6 s; the number of overtaking manoeuvres in a competition day was the same as that of the CG and amounted to 6, 2 of which were successful, 4 were not successful; a mental turn passing took 2,75±1 s, for one circle the time constituted 10,0±3,0 s; the angle of inclination to the bearing surface was 40±5, the ranking was 14±2. At a distance of 1000 m, the EG showed the result of 1.34,0±0,8 s; 8 overtaking manoeuvres were performed, 3 of which were successful, 5 were not successful; a mental turn passing took 2,76 ± 1 s, for one circle the time constituted 10,0±3,0 s, the angle of inclination was 40±5 degrees, the ranking was 15±2.

In the CG several running features were identified. At a distance of 500 m, the short trackers gained maximum speed from the first meters; the speed peak was achieved at the second segment of the distance, while by the end of the distance, at the final circle (the fourth segment) the speed gradually decreased. At a distance of 1000 m, the athletes gradually increased the speed before the experiment, showing the maximum values at the third segment of the distance, which led to the speed decrease at the last circle. At a distance of 1500 m, short trackers ran all the segments of the distance at a steady speed, with the exception of the starting acceleration.

TABLE II. TECHNICAL AND TACTICAL RESULTS OF QUALIFIED SHORT TRACKERS AFTER THE EXPERIMENT

	Distance, m					
	1500		***500***		***1000***	
	CG	***EG***	***CG***	***EG***	***CG***	***EG***
1 Time at a distance, min	148,0±1,0	148,5±0,8	43,4±0,5	43,5±0,6	93,1±0,7	93,3±0,8
1st segment time, s	10,7	11,0	7,0	6,9	12,3	12,5
2nd segment time, s	85,0	86,8	17,6	18,2	42,2	43,4
3rd segment time, s	41,8	40,5	9,3	9,2	28,4	27,6
4th segment time, s	10,5	10,2	9,5	9,2	10,2	9,8
2 Number of overtaking maneuvers in a competition day						
– total number	10	12	6	7	8	9
– successful	3	6	2	4	3	5
– unsuccessful	7	6	4	3	5	4
3 Inclination angle when passing a turn, degrees, degrees	45±5	33±5	40±5	27±5	40±5	30±5
4 Overall ranking	12±4	10±2	13±2	9±2	15±4	7±3
5 Mental passing a distance segment with maximum speed, s						
– turn	3,70±1,0	3,3 ± 0,6	2,75±1,0	2,75±0,8	2,76±1,0	2,75±0,8
– 1 circle	10,0±2,9	10,1±1,8	10,0±2,9	9,8±1,7	10,1±3,1	9,8±1,7

Before the experiment short trackers of the EG developed maximum speed from the first meters at the distances of 500, 1000 and 1500 m, which led to the speed drop at the last circle, and as a result, losing to contestants at the finish [3].

Thus, before the experiment the sports results of the two groups were on the same level, the difference was in a manner of conducting a tactical battle. The sample is homogeneous and allows carrying out a pedagogical experiment.

When comparing the results of the CG and EG before and after the experiment, the following indicators were obtained. The time at a distance of 1500 m did not decrease significantly in the CG and the EG after the experiment ($p<0,05$), however, the EG athletes began to distribute their efforts in a competent manner, which allowed them to make effective finishing kicks. Moreover, their number of overtaking manoeuvres in a competition day increased significantly from 10 to 12 (before the experiment, the number of successful overtaking manoeuvres was 3, after - 6) ($p>0,05$), while in the KG the number of overtaking manoeuvres did not change (3 successful of 10) ($p<0,05$).

The time of a mental turn passing in the EG decreased by 0,3 s ($p> 0,05$) compared to the results before the experiment, which is 0,4 s better compared to the CG. The average circle passing time decreased by 0,6 s ($p>0,05$), the average deviation in the group also decreased, the angle of inclination to the bearing surface when running a turn became sharper by 12 degrees ($p>0,05$). A positive increase in the results led to the best ranking positions of the EG at a distance of 1500 m.

At a distance of 500 m, the time of CG decreased by 0,5 s ($p>0,05$), and in the EG - by 0,2 s ($p<0,05$). Qualitative parameters of the EG improved in terms of the final ranking, which was 9±2 (improvement by 5 positions), and the number of successful overtaking manoeuvres (4 out of 7 per competition day). The angle of inclination when running a turn in the CG decreased by 13 degrees, the rest of the parameters remained unchanged compared with the results before the experiment.

At a distance of 1000 m, improvement in the CG was 0,4 s, and in the EG – 0,7 s due to the competent efforts distribution at the distance. It should be noted that EG athletes had more advantageous positions by the end of the race due to an increase in the number and quality of overtaking manoeuvres. After the experiment the number of overtaking manoeuvres in this group increased to 9 (5 overtaking manoeuvres were successful), which affected the ranking in the final protocol: before the experiment it was 15±4, after - 7±3 ($p>0,05$). The ranking of the CG athletes did not change after the experiment. The angle of inclination when running a turn in the EG decreased (30±5 after the experiment, before the experiment it was 40±5) ($p>0,05$). In the CG the angle of inclination when running a turn remained unchanged (40±5). The time of a mental turn passing changed in the EG, while in the CG this parameter did not change. At one circle the time in the EG decreased by 0,2 s (the dispersion in average values decreased by 1,3 s), while the average time dispersion in the group decreased from 3,0 to 1,7 s. In the CG, the time of a mental circle running at maximum speed remained unchanged (10,0±3 s).

At each distance short trackers perform 5-6 times. Athletic performance improves from preliminary races to semi-finals, however, at the finals athletes can show time which is either better or worse than in previous races. It depends on how

much energy and effort an athlete has spent before reaching the finals, as well as on a tactical battle between the athletes.

The developed methodology was introduced into the training process of the groups at the stage of the sportsmanship improvement at the Municipal Budgetary Institution of Chelyabinsk "Speed skating Olympic reserve school named after L.P. Skoblikova", coached by R.A. Losev, N.V. Panasyuk. The short trackers of 14-16 years old under the study became winners of city, regional and territory competitions in the season 2018-2019.

IV. CONCLUSIONS

According to the study, the following results were obtained: at a distance of 500 m, the number of overtaking manoeuvres in the EG increased from six to seven; while the quality of overtaking manoeuvres improved from two to four; a circle running time decreased by 0,2 s - from 10,0±3,0 s to 9,8±1,7 s; the average time dispersion in the group decreased by ±1,3 s; the ranking improved from 14 to 9; the angle of inclination decreased by 13 degrees. At a distance of 1000 m, the number of overtaking manoeuvres increased from eight to nine; while the quality of overtaking manoeuvres improved from three to five; a circle running time decreased by 0,2 s - from 10,0±3,0 s to 9,8±1,7 s; the average time dispersion in the group decreased by ±1,3 s; the ranking improved from 15 to 7; the angle of inclination decreased by 10 degrees. At a distance of 1500 m, the number of overtaking manoeuvres increased from 10 to 12; while the quality of overtaking manoeuvres improved from three to six; a turn running time decreased from 3,6±1,0 s to 3,3±0,6; a circle running time decreased from 10,7±3,0 s to 10,1±1,8 s; the ranking changed from 12 to 10; the angle of inclination decreased by 12 degrees.

In a competition period of qualified short trackers, it is necessary to plan the training process, aimed not only at increasing the level of physical and functional state, but also at improving the technical and tactical skills of the athletes by means of ideomotor training; increasing the number of exercises performed on a turn; practicing early acceleration when finishing. Based on the described pedagogical recommendations, it is necessary to organize and carry out the training process, which will increase the level of technical and tactical preparedness of 14-16-years-old short trackers. As a result, it will have a positive effect on their athletic performance, namely on their ranking at the finals.

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