Proceeding

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The organization training process system for young hockey players through speed qualities development by the means of "*Ice track*"

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ABSTRACT

The article analyses the data obtained by the sigma sports pulsometer of pc15 with the author's technology realization within the speed endurance development for 10–11-year-old hockey players by means of a specialized hockey track. There is a description of the narrative and final results for each technology (program) stage. Within the stages of the pedagogical experiment, there was a classification test of physical development, which allowed us to speak about the effectiveness of the technology in use.

Keywords: Young hockey players; Speed endurance; Ice track; Development technology of speed endurance; Heart rate; Training process.

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INTRODUCTION

In 2012, in Saint Petersburg there was International forum of "Innovative technologies in the field of specialized hockey equipment, modern training methods, functional diagnostics and rehabilitation processes for athletes".

The forum was a joint project of the KHL, St. Petersburg hockey school "Gladiator", the St. Petersburg hockey Federation and the University named after Lesgaft. The coaches from Russia, scientists, administrators of sports clubs and youth sports schools had the opportunity to participate in discussion in concern of the current issues of modern hockey development between each other and with foreign colleagues. The specialists from North America shared their long-term experience and informed about new developments. In total, more than 100 people participated in the event.

The foreign guests admitted the traditions of Soviet hockey, made compliments in relation to the actual methods and means of special physical culture within the training process of hockey players.

The former coach of the US national team Lou Vairo lectured about the American hockey development model. He underlined the issue of individual approach in relation to each hockey player's personality development within the role of competitive player on the Ice hockey rink.

The American specialists highlighted the new sports technologies in modern American hockey.

Author of the book "Fundamentals of speed and power skating in hockey " Laura Stamm lectured about the influence of power skating techniques on the development of control and speed qualities of the player.

At this forum, there was a specialized instruction track for skating techniques. There was a special mention in regard to the high potential of the equipment through the coach control of the player's actions and the possibility to correct errors at once.

Seven years have passed since the International forum "Innovative technologies in the field of specialized hockey equipment, modern training methods, functional diagnostics and rehabilitation of athletes".

During these seven years, the ice hockey track gained huge popularity.

The examination of ice hockey track presence in Tolyatti revealed two specialized centres of hockey training, where within the working process there is modern equipment. In each centre there is individual author's methodology.

METHOD

There was special attention in regard to the author's training program of the ice hockey training centre "Pchela". A special feature of this program is the step-by-step development of hockey player functional abilities with concern to age, specialization and physical fitness. The developer of the training process is a forward player of the Belarusian national team, a participant of the Olympic games in Vancouver, a student of Tolyatti hockey school Demagin S. A.

To test this training method on a specialized hockey track, there was an experiment among the pupils of the "Volgar" young students of sports school, born in 2009, with specialization in ice hockey.

The goal is to develop a special speed endurance of hockey players in the age of 10-11 by means of a specialized ice hockey track.

The object of the research is the training process of young hockey players in the age of 10-11 on specialized ice hockey track.

The subject of the research is the means and methods for the development of special speed endurance of a young hockey player in the age of 10-11.

The key research tasks:

1. To develop a special speed endurance of hockey players in the age of 10-11 by means of a specialized ice hockey track;
2. Examine the technique characteristics of the correct skating movements;
3. To test the author's training methodology within the development of the physical, functional and psychophysical abilities in regard to young ice hockey players be means of special ice hockey track.

We made a hypothesis that thanks to the author's training methodology, young ice hockey players of the 2009 year of birth in the team "Volgar" in Togliatti will increase the level of special speed endurance and functional abilities, thus the recovery period will pass faster and there will be the practical realization of tactical tasks on the ice hockey rink.

The methodology for the development of special speed endurance by means of a specialized ice hockey track consists of three programs. Each program has its own goals and objectives, and the defined final result.

Table 1. Technology for the development of special speed endurance.

№ of program	**Programme objective**	**Tasks**	**Final result**
Program 1.	Determine the technique of correct skating movement on an ice hockey track.	1. Present the basic terminology concepts of special physical culture within the working program on the ice hockey track. 2. Determine the initial special physical fitness of a young hockey player with the diagnostic methods (examination of speed endurance on the ice hockey track). 3. Develop the ability to perform technically correct basic movements of hands and feet during the skating on the ice hockey track. 4. Develop the basic movement skills necessary for young hockey players on the ice hockey rink by the modern means of special physical culture	1. There is a correct skill performance of ice skating technique. 2. There is a formed ability to control the position of the body on ice hockey rink in accordance with the movement speed changes. 3. There is an increase in the indicators performance of the main physical qualities necessary for the harmonious psychophysical development of a young hockey player.

		(cords, TRX suspension, tape expanders, etc.). 5. Teach stress resistance behaviour in relation to changes in physical activity on ice hockey rink. 6. Strengthen the cardiovascular system and the muscular corset of the student.	
Program 2.	Teach the ice skating technique by the means of the additional equipment on the ice hockey track.	1. Continue to work on the coordination of hands and feet in accordance with changes in speed, time and rhythm of motor actions. 2. Increase the indications of speed and strength within the body performance qualities by means of modern fitness technologies. 3. Realize the intermediate diagnostics of motor actions on a hockey track. 4. Increase the level of psychophysical development at the expense of changes in the body's response to motor tasks. 5. Continue the work to strengthen the functional properties of the student's body.	1. Introduce the diagnostics results, improve errors in skating technique. 2. Make changes to the training process on the basis of the obtained test data for the successful implementation of a specialized hockey track program. 3. The technique of skating achieved automation quality. The work of the body motor apparatus does not require conscious control of the student. 4. The body reaction to motor tasks increased.
Program 3	The improvement of ice skating technique at the expense of regular long-term trainings on a hockey track.	1. Utilize the equipment that contributes to the intensive anaerobic development of hockey player on the highest level within the training process. 2. The training program for General physical fitness bases on the principles of interval training with aim to increase the muscle, speed and functional endurance of a professional hockey player. 3. We use the maximum tilt angle and speed mode of the equipment to increase the speed reaction of the player on the ice hockey track. 4. The implementation of training work to strengthen the body's muscular corset occurs within the free weight zone. 5. In order to avoid hypertrophy of muscle fibres, the program provides cycles of short high-intensity strength exercises.	1. The skating technique corresponds to a hockey mastery of a high level. 2. The sport form of a hockey player reflects the state of athlete preparedness to make sports achievements within the background of the existing level of preparedness and training. 3. The psychological readiness of a hockey player who has passed a specialized program on a hockey track includes stability, control and agility of attention, reaction speed in regard to external information. 4. The increase of athlete capabilities through the development of vegetative

		6. Analyse the motor preparedness of a professional hockey player.	systems to ensure muscle work and increase the organism resistance to negative changes in the body internal environment.

30 young hockey players participated in the experiment. They formed two groups , a control group and an experimental group.

The control group consisted of 15 people, it included children of the main team "Volgar", the experimental group included athletes of the second membership of the same team.

RESULTS

The analysis of the physical qualities study for two groups on "earth " showed no statistically significant differences ($p. > .1$). The study of special speed endurance on ice hockey rink discovered that the experimental group had lower results than the control group, and statistically significant differences occurred at $p < .05$.

Thus, the preliminary testing of special speed endurance confirmed our hypothesis about the need to use the author's training technique within the training process on a specialized hockey track.

During six months' time period, the experimental group's training sessions passed at the Pchela hockey centre in Togliatti on a specialized "Technocokk" hockey track. We used the sigma sports pulsometer of pc15 to detect heart rate at various levels of aerobic capacity. The determination basis of the optimal physical activity by heart rate belonged to the formula.

Upper (1) and lower (2) margin of heart rate values for individual determination of the optimal range of heart activity, There is recommendation not to exceed the lower margin within the physical activity.

Table 2. The working heart rate within the training load zones at the beginning of the experiment.

N/n	Heart rate within anaerobic training load (bpm.) (high intensity training zone)	Time of training recovery (sec.)	The heart rate in case of aerobic exercises (bpm) (medium intensity training zone)	Time of training recovery (sec.)	The heart rate in a low-intensity training zone
1.	182	30	145	40	120
2.	170	30	130	40	118
3.	181	30	128	40	112
4.	180	30	135	40	114
5.	193	30	156	40	136
6.	160	30	130	40	112
7.	170	30	154	40	120
8.	165	30	129	40	110
9.	164	30	137	40	128
10.	175	30	156	40	130
11.	190	30	154	40	133

12.	192	30	158	40	135
13.	186	30	137	40	116
14.	198	30	160	40	138
15.	176	30	135	40	117

The study of heart rate by training load zones occurred at the beginning of the experiment.

The results showed that within the high intensity training zone, the heart rate of young hockey players raised beyond 180 beats / min, while the track speed and the tilt angle slightly increased, from the initial position of the equipment. The training time within a high-intensity zone constituted 30 seconds.. There was a violation of skating technique in the group of children with heart rate over 180 bpm. There was a loss of movement rhythm, unison of arms and legs movements, the skating turned into a mincing run.

In a low-intensity zone after 40 seconds. recovery the heart rate indicators of 6 people exceeded the margins of 120 bpm. The implementation of training work within this zone occurred also in 30 seconds, but the equipment stayed in the initial position. The children controlled the skating technique, the movement of the arms had not lost coordination, but the smoothness of the slide worsened, the body strongly tilted forward.

The initial testing allowed us to conclude that this category of children is not ready to solve game problems on the ice hockey rink. The increased heart rate indicators in high intensity training and low intensity training zones mark a low development level of special speed endurance.

After testing, we selected the tools and methods of special sports training that promote the development of speed endurance, there was the organization of individual work plans for each player with concern to his morpho-functional development and specialization , there was the allocation of days and number of training sessions on a specialized hockey track under the guidance of Demagin S. A.

In the end of each program of the author's training methodology, there was an intermediate test, where we recorded the results and made the adjustments to the training process. To determine the effectiveness of the training work, the experimental group of children participated in friendly games with the control group and teams from other clubs.

After three months of the experiment, the coach of the Volgar-2009 hockey team exercised the rotation among players. Several children from the experimental group transferred to the starting and second group of five players.

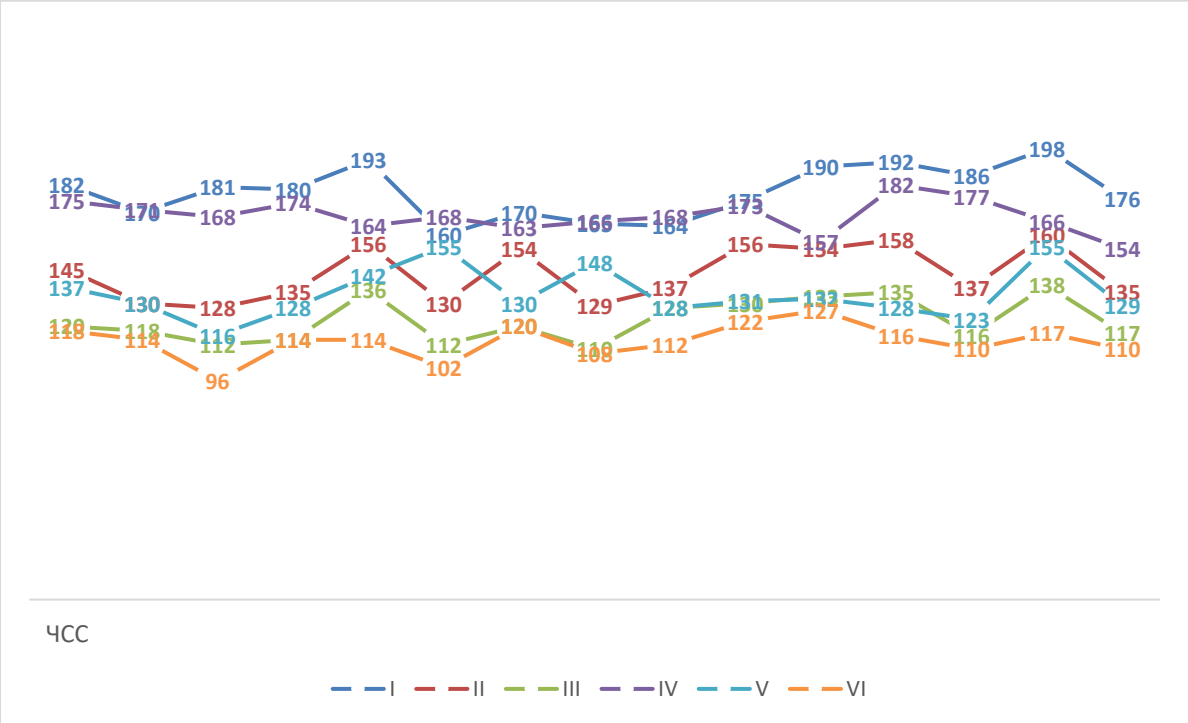
In the end of the experiment, there was a control test.

Table 3. The working heart rate within the training load zones in the end of experiment.

N/n	Heart rate within anaerobic training load (bpm.) (high intensity training zone)	Time of training recovery (sec.)	The heart rate in case of aerobic exercises (bpm) (medium intensity training zone)	Time of training recovery (sec.)	The heart rate in a low-intensity training zone
1.	175	30	137	40	118
2.	171	30	130	40	114
3.	168	30	116	40	96

4.	174	30	128	40	114
5.	164	30	142	40	114
6.	168	30	155	40	102
7.	163	30	130	40	120
8.	166	30	148	40	108
9.	168	30	128	40	112
10.	173	30	131	40	122
11.	157	30	132	40	127
12.	182	30	128	40	116
13.	177	30	123	40	110
14.	166	30	155	40	117
15.	154	30	129	40	110

According to the final test results, we can conclude that the heart rate of the experimental group stays within 180 bpm, after 30 seconds of recovery, the training load within the medium intensive training zone of participants begins with 116 bpm and does not exceed 150 bpm. In 40 seconds of recovery the data of heart rate drops to 96 bpm. However, the intensity and angle of the hockey track is higher than at the beginning of the experiment, the sliding technique has qualities of smooth movements, the skate setting corresponds to a straight line, does not go to the side. With a high speed track, the movements save rhythm and coordination. During the game, the children of the experimental group began to stay on the ice hockey rink longer and react faster to changes in motor tasks. The recovery period became shorter, respectively, exits from the shift began to occur more often, the time spent on the ice hockey rink has increased.



Note: I, IV – high intensity training zone (I-before the experiment, IV - after), II, V-medium intensity training zone (II before the experiment, V-after V), III, VI-low intensity training zone (III - before the experiment, VI-after).

Figure 1. The comparison of heart rate at the stages of the ascertaining and formative experiment.

CONCLUSION

Thus, the observations over the players within the course of games and the results of control diagnostics allowed us to make a conclusion about the effectiveness of the author's training methodology with aim to develop special speed endurance within the group of young hockey players in the age of 10-11 by means of a specialized hockey track.

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