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SHOOTING RANGE IMPROVEMENT AT JUNIOR BIATHLETES USING MODERN TECHNOLOGY

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Abstract: *Shooting range improvement to juniors in biathlon is extremely difficult and very important in the training process. The usage of modern technology like SCATT simulator and SKIErg were the main focus of this research. A group of 4 well-trained young biathletes 17-19 years old, with at least 5 years of training experience in skiing and biathlon were recruited as participants. Every athlete had 0.5 hours of SCATT-shooting 3 times per week and 1 hour of SKIerg 4 times per week. All the biathletes had an improvement for all the control test (T1-T4) and after this research is highly recommended that in the training process of the young biathletes to be used the modern technology.*

Key words: *Biathlon, Shooting Training, Modern technology.*

1. Introduction

Researchers' concerns regarding the field of sports performance and the biathlon ski sport have always presented a high degree of interest among the specialists directly involved in the sports training process. One of these concerns was the preparation of the range sequence, more precisely the finding of ways to influence it, especially at the age of junior age.

The objectives and tasks of the high-performance biathlon in our country, in the next period, can be achieved only if the training methodology will be correctly directed and scientifically substantiated.

Achieving this qualitative leap is not possible without paying attention to the following in the training process:

- Continuous modernization of the training process, knowledge and application of the latest achievements of theory and practice;
- Observance of the workload at the world parameters that include 1300-1400 training hours, 8000-10000 km, 9000-11000 cartridges per year for the athlete at performance level;

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2. Device Description

Fig.1. *Shooting with SCATT shooting system (*http:// www.scatt.com).

The SCATT shooting system simulator consists of the optical sensor, fasteners (to secure the optical sensor on the weapon), the optical target located 5-10 meters from the shooter, the target interface cable, the electronic target control and computer software (Figure 2).

The SCATT shooting simulator operation is based on determining the aiming point coordinates. The aiming points create the shooter's target path. The geometry of the path (aiming trajectory) and its length are determined by the shooter's qualification level.

Fig.2. *Shooting system simulator* SCATT (http://www.scatt.com).

Fig.3. *Scatt MX-W2*

Wireless optical sensor can be mounted on the vast majority of guns. MX-W2 syncs with your computer or portable devices via Wi-Fi and its battery capacity delivers the minimum of 3 hours of non-stop use.

3. Objectives of the preliminary experimental research

- optimizing the technical ability and obtaining the performing results of the subjects of the preliminary study;
- establishing a system of methodical and functional training with monitoring and evaluation of the parameters resulting from the control tests;
- staging the training and testing specific to the activity in the biathlon range.

3.1. The purpose of preliminary experimental research

The aim of the research is to establish a battery of investigation the rough specific tests, monitoring and evaluation of specific training for shooting in the range in order to increase sports performance based on optimizing specific psychomotor parameters in the range activity in the biathlon test.

4. Subjects and Research Design

The subjects of the study are 4 athletes aged 17-19 years, junior biathletes from the Dinamo Rasnov School Sports Club. The experiment consisted in evaluating the range sequence at the beginning of the land preparation period and then at the end of this period, took place at the sports base at the Dinamo Râșnov School Sports Club located on Valea Cărbunării-Râșnov as well as at the sports base at Fundata-Cheile Grădiștei and lasted 8 weeks between July 8 and August 31, 2019.

The subjects were subjected to two evaluations: an initial evaluation that took place between 8-9.07.2019 and a final evaluation that took place between 30-31.08.2019.

4.1. Program for optimizing the range sequence for junior biatlonists - preliminary research

In the preliminary research during the period between the two tests (initial test and final test) the following program was applied for optimizing the range sequence for junior bialonists with the consent of the coaches and athletes from the Dinamo Râșnov School Sports Club. We applied this program to check the set of methods and means that we want to use in the final research in the basic experiment in Part III. During this period, between 5 and 6 workouts are performed weekly.

Planning the proposed 8-week training program for the range sequence Table 1

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	A1	A2	A3	A4	A5	A6	Rest
2	A1	A2	A3	A4	A5	A6	Rest
3	A1		A1			Rest	Rest
4		A2		A2			Rest
5	A3	A5		A4	A6	Rest	Rest
6	A4		A3		A5		Rest
7	A1	A2	A3	A4	A5	Rest	Rest
8	A1	A2	A3	A4	A5	A6	Rest

A1- Technique of maintaining the line of sight-lying position
A2-Technique of maintaining the line of sight-standind position
A3-Fire-triggering activity
A4-Coordination of the partial elements and the formation of an automated development of the movement
A5-Learning the firing rhythm
A6- Improving the movements in the range

5. Results

Data from initial and final testing Table 2

Control Test	Testing	Average	Dif.average (F-I)	Median	Standard deviation	Coefficient of variability	Minimum value	Maximum value
1	Initial	17,825		17,95	1,01	1,02%	16,5	18,9
	Final	16,25	-1,57	16,7	1,44	2,08%	14,2	17,4
2	Initial	4,75		4,8	0,42	0,17%	4,2	5,2
	Final	4,525	-0,225	4,7	0,427	0,18%	3,9	4,8
3	Initial	45,175		45,7	2,11	4,47%	42,3	47
	Final	42,85	-2,325	43,2	2,76	7,66%	39,2	45,8
4	Initial	65%		65%	5,77	33,33%	60%	70%
	Final	75%	+10%	75%	5,77	33,33%	70%	80%

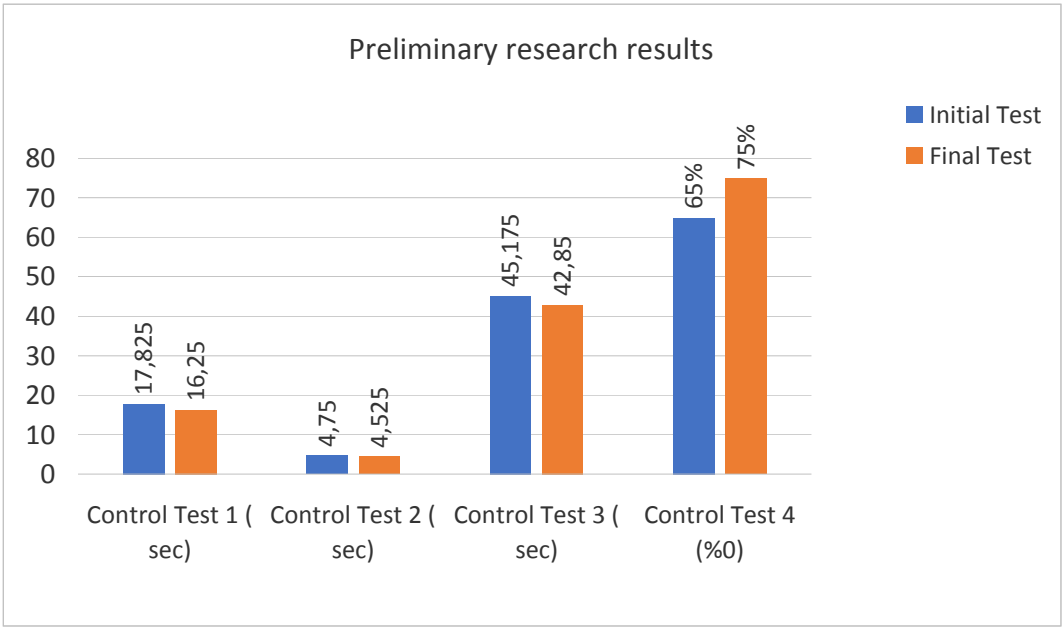

Fig.4. *Comparative data of the research results*

The average time at the test of preparation for shooting from the prone position decreased at the final test by 1.57 sec from 17.825 sec to 16.25 sec, progress achieved 8.83%. The median decreased at the final test by 1.25 sec.

The time dispersion in this test is homogeneous in both tests. The times achieved vary between 16.5 and 18.9 sec in the initial test and between 14.2 and 17.4 sec in the final test.

The average time at the test the rhythm between fires from the prone position decreased at the final test by 0.225 sec from 4.75 sec to 4.525 sec, progress achieved 4.73%. The median decreased at the final test by 0.1 sec.

The time dispersion in this test is homogeneous in both tests. The times achieved vary between 4.2 and 5.2 sec in the initial test and between 3.9 and 4.8 sec in the final test.

The average time at the test time spent in the range from the prone position decreased at the final test by 2.325 sec from 45.175 sec to 42.85 sec, progress achieved 5.14%. The median decreased at the final test by 2.5 sec.

The time dispersion in this test is homogeneous in both tests. The times achieved vary between 42.3 and 47 sec in the initial test and between 39.2 and 45.8 sec in the final test.

The efficiency of shooting from the prone position increased at the final test by 10% from 75% to 65%, progress made 13.33%. The median increased at the final test by 10%.

The time dispersion in this test is homogeneous in both tests. The percentage achieved varies between 60% and 70% in the initial test and between 70% and 80% in the final test.

6. Conclusions

Based on the preliminary experimental research initially conducted with questionnaire survey to find out what is the orientation in the training methodology of expert coaches in the training of junior athletes with a view to raising their level of performance in the biathlon test, a unit of views was found in certain points indicated by analyzing the results of the questionnaire.

Following the analysis of some results of the experimental research for this category of juniors at international and national level, we sought to adapt the specific range samples to the parameters with individualized psychomotor aspect, resulting from the application of the training program for a period of 8 weeks. , noting that there is progress on each topic which is a limitation of performer research.

In order to orient ourselves towards a basic research according to the results obtained in the preliminary research, we sought to generalize by statistical-mathematical processing of the whole group to find new innovative ways and methods with the application of a modern technology in preparing future performers.

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