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IMPROVING THE BIATHLON JUNIOR ATHLETE PERFORMANCES BY OPTIMIZING THE TECHNICAL TRAINING FOR THE SHOOTING EVENT

INTRODUCTION

The biathlon skiers have a severe training programme, because in addition to the learning of ski movement techniques (the downhill, flat, valley sliding, valley turns, etc.), they must be aware of the fact that the moment when they pass through the shooting range can be critical.

If the start in the event is made at the highest parameters, when the athlete enters the shooting range he/she must have his/her respiratory functions, heart rate, and concentration at an optimum level for obtaining the perfect results, as well as making the specific movements, like stopping at the shooting place, leaving the ski poles on the ground, bringing the gun in target position, regulating his/her breathing, aiming and shooting, as precisely as possible, otherwise the athlete could lose extra seconds, which could lead to him/her losing the race.

Starting from the idea that all of these actions can be perfected, we talked to the coaches who allowed us to introduce new elements in order to improve the training programme.

RESEARCH HYPOTHESES

In addition to the problems regarding the sliding, pushing, change in direction, etc., actions that can be remedied by numerous means of perfecting the basic technique of the athlete (the running, etc.), the specific shooting range actions play a decisive role in attaining top performance.

In elaborating the hypotheses of this research, we started from the following assumptions:

1. Through dexterity exercises, performed in a speedy manner, we can achieve a series of automatisms that are necessary for the shooting range moment, up until the first fire, for the prone position, and through coordination exercises, with

a high number of repeatings in a time unit, we can automatize the moment of getting into the shooting position;

2. The shooting can be perfected by holding the rifle, to which more weight was added, simulating the shooting, and retaking the aiming position; thus, through a large number of repeatings for ending the shooting and exiting the shooting range, we can attain perfection for restarting the sprint in optimal conditions.

We can say from the beginning that these exercises can lead to an improvement of the total time during the event, and, by default, of the time spent in the shooting range. The exercises must be performed as stand-alone elements, and not as part of higher amplitude actions.

RESEARCH TASKS

Starting from the idea that the Romanian athletes have reasonable enough time averages in the ski sprint and shooting, we concluded that there somewhere must be a fault in the training: motor activity, methodology, etc. After analyzing many sets of results, we could observe that the shooting range, due to certain factors, dependent or independent of the motor activity, is or can be the place where the final result can be turned.

The aims of this research are:

1. learning the action proceedings up until the first fire is shot:
 - putting the ski poles on the ground at an optimal distance;
 - taking the shooting position with the least amount of complementary actions;
 - positioning the rifle for shooting the first fire;
 - assessing the shots, and self-assessing one's own actions according to the immediate result;
 - repeating the final actions of leaving the shooting range until they become automatic.
2. performing the 5 shots in a rhythmic manner, according to the heart and respiratory rate.

The subjects of the experiment

We formed a group of four athletes, who, due to their academic schedule, worked separately, only the week-end trainings being common: **C. S., Sz. I., Cs. A., S. M. - the experimental group.** This group attained its objectives, its training plans being mostly identical with the ones for the control group, the difference being in the specific shooting range training exercises.

Due to the favourable conjuncture, these athletes were trained differently than their colleagues, who previously had better results.

The team members were **A. L., B. B., K. J., P. Zs.** The **control group** was represented by the ones who performed their training according to the plan set by the coach, based on their previous training level, effort adapting ability, and the goals of each athlete. The experimental group participated in the set programme, with a very good presence records.

PERSONAL CONTRIBUTION

The results of the trainings, besides enhancing the athletes' effort capacity, their arm strength through dumbbell and barbell exercises, would be development of their internalization and automation of the actions in the shooting range through certain groups of special exercises of medium intensity.

Through the rhythm of the performance of the exercises, we aimed for a better personal adaptation to the speed of the shooting range performances; through the number of performances, combined with sprinting, we aimed for a certain dosage and a self-control of the athlete when exposed to a premature tiredness, the athlete's search for an optimal effort dosage.

These forms of training, the variety of uses of the means in the specific training programme, lead to mental demands regarding self-assessment, forming an approaching tactic for a less valuable race. Through changes and combining elements from the specific shooting range exercise, we aimed for the internalization and automatisisation of certain means for correcting, concentration, etc. These exercises were based on the actual shooting range activity.

For this experiment, we applied the following shooting range training exercises, their dosage and combinations being chosen by the athletics trainer, or by the head coach.

- taking the rifle from its stand, situated at 10 m from the shooting position;
- putting the rifle on the back - the ski sprint position;
- putting the ski poles on the ground;
- getting into the aiming position;
- simulating the shooting;
- lifting and moving the rifle on the back;
- getting ready for sprint.

The exercises can be combined with roller skis, on a loop of 300m, 500m, 750m, performing 2, 3, 4, or 5 shootings, or different combinations.

The athlete can perform series of sprints on the same distance, or progressive-regressive, taking into account the type of training at the moment of that performance (endurance, speed, agility). What is important is a high number of performances in the same time unit.

Regarding these exercises, we can see that they were in no particular order, no solution was given, but the action itself was only recorded. The performance of these exercises supports the idea that each moment in time is different from the other, the creativity and the performance having to be oriented towards the moment of performing the specific motor acts in the shortest time possible.

We had to emphasize in some manner the role this specific training has played. Hence, we established a set of control rules, in which, besides the subjects, two timing referees participated, having the task to follow the athletes from their entrance in the shooting range, to their exit, within a well-defined space. Each time was registered and accounted for by a secretary.

The control drills were performed a week after the first training stage began, when the physical and the shooting training were just starting, and the effort capacity was at medium level.

PRESENTATION AND INTERPRETATION OF THE RESULTS

Following the structure, this research aimed to determine the causes of poor results at international biathlon competitions of the Romanian team; the results show several issues:

1. regular participation in training is a major problem;
2. guns and cartridges yield athlete quality results in polygon;
3. using means of preparation sometimes varied by details of some cases can have damaging effects.

Direct results of this research are presented in the following tables:

Table 1. Initial control test 10 km Ski Roller - 4 shooting (Down - Feet - Down - Feet) - June 2009

Athlete	Control group				Experimental group			
	A.L.	B.B.	K.J.	P.ZS.	C.S.	SZ.I.	CS.A.	S.M.
Running	8'56"	9'01"	9'05"	9'10"	8'51"	9'05"	9'11"	9'16"
Shooting range	1'10"	1'12"	1'16"	1'20"	1'13"	1'16"	1'20"	1'26"
Penalties	1	2	1	2	1	3	1	2
Running	9'11"	9'13"	17"	9'20"	9'14"	9'17"	9'22"	9'27"
Shooting range	1'06"	1'18"	1'20"	1'23"	1'09"	1'20"	1'23"	1'29"
Penalties	0	1	0	3	1	2	2	3
Running	10'35"	10'30"	10'40"	10'35"	10'38"	10'34"	10'44"	10'40"
Shooting range	1'15"	1'15"	1'20"	1'25"	1'18"	1'19"	1'26"	1'32"
Penalties	1	2	3	2	2	2	3	2
Running	12'48"	13'01"	13'05"	14'00"	12'51"	13'05"	13'11"	14'07"
Shooting range	1'20"	1'18"	1'21"	1'24"	1'23"	1'20"	1'26"	1'31"
Penalties	2	2	1	3	2	2	1	3
Total penalties	4	7	5	10	6	9	7	10
Running time	41'30"	41'45"	42'07"	43'05"	41'42"	42'01"	42'28"	43'30"
Shooting range time	4'51"	5'13"	5'17"	5'32"	5'03"	5'15"	5'25"	5'58"
Total time	46'51"	46'58"	47'14"	48'37"	46'45"	47'16"	48'03"	49'28"

Table 2. The final control test 10 km Ski Roller - 4 shooting (Down - Feet - Down - Feet) - October 2009

Athlete	Control group				Experimental group			
	A.L.	B.B.	K.J.	P.ZS.	C.S.	SZ.I.	CS.A.	S.M.
Running	8'45"	8'55"	9'00"	9'00"	8'51"	8'50"	9'02"	9'12"
Shooting range	1'10"	1'11"	1'15"	1'14"	1'01"	1'02"	1'06"	1'16"
Penalties	1	2	2	1	1	1	1	2
Running	9'01"	9'08"	9'15"	9'20"	9'10"	9'15"	9'22"	9'25"
Shooting range	1'02"	1'15"	1'16"	1'16"	1'02"	1'03"	1'13"	1'18"
Penalties	1	1	1	1	1	1	1	1
Running	10'28"	10'25"	10'32"	10'25"	10'22"	10'30"	10'46"	10'40"
Shooting range	1'10"	1'13"	1'15"	1'20"	1'10"	1'08"	1'20"	1'17"
Penalties	2	1	1	1	2	1	2	2
Running	12'20"	12'30"	12'33"	13'50"	12'30"	12'40"	12'45"	13'01"
Shooting range	1'13"	1'17"	1'18"	1'20"	1'18"	1'20"	1'16"	1'20"
Penalties	0	2	2	3	1	0	2	1
Total penalties	4	6	6	6	5	3	6	6
Running time	40'34"	40'18"	40'08"	42'35"	40'13"	40'35"	41'15"	42'18"
Shooting range time	4'35"	4'56"	5'04"	5'12"	4'31"	4'33"	4'55"	5'11"
Total time	45'19"	45'14"	45'12"	47'47"	44'44"	45'08"	46'10"	47'29"

As can be seen from the comparative analysis of results, the progress made by the experimental group members is more than notable. The first hypothesis was that all the components in the experimental group would exceed their performance speed in the shooting range and the results confirmed this. Fear of the result or effect of „encouraging” by announcing times, lack of experience, or distraction has caused poorer results at the last shooting range drill. Penalties acquired in the experimental group were also significantly lower than in previous drills. Regularity in the Report Control - contemplating a more detailed experiment proved its best education.

Table 3. Ratings of 8 players after the test

	Athlete	Time	Penalties	Total time	Place
Control group	A.L.	45'19"	4	49'19"	2
	B.B.	45'14"	6	51'14"	5
	K.J.	45'12"	6	51'12"	4
	P.ZS.	47'47"	6	53'47"	8
Experimental group	C.S.	44'44"	5	49'44"	3
	SZ.I.	45'08"	3	48'08"	1
	CS.A.	46'00"	6	52'00"	6
	S.M.	47'29"	6	53'29"	7

Following this classification we can say that there was a mixing of power. Progress made by the experimental group regarding the concentration, rhythm coordination of actions carried out safely in the shooting range, the power concentration gain before and during the shooting are phenomena that appear to well-trained athletes. Ratings were made on test at the two most important proposed research plans and kept for subsequent comparisons, analysis of research.

Table 4. Penalties and shooting time

Ratings:	
Total penalties	Total shooting range time
3 - 4 = VG	4'30" - 4'35" = VG
5 - 6 = B	4'36" - 5'00" = G
7 - 8 = S	5'01" - 5'15" = S
over 9 = NS	over 5'16" = NS

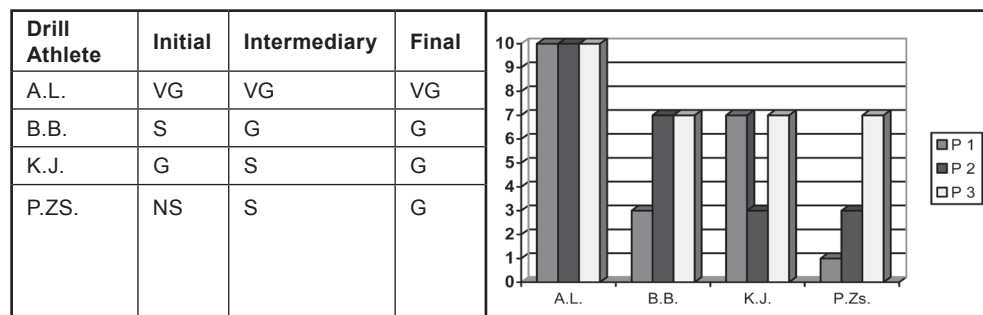
In order to graphically emphasize the ratings the athletes got after participating in all of the control drills, we gave them the following values:

Table 5. Score according to ratings

Score according to ratings:	
VG =	10 points
G =	7 points
S =	3 points
NS =	1 point

Table 6. Ratings for the three control drills - total penalties

Control group



Experimental group

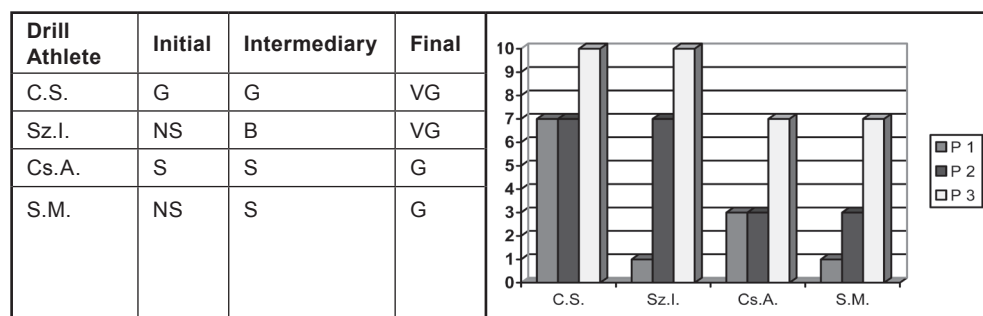
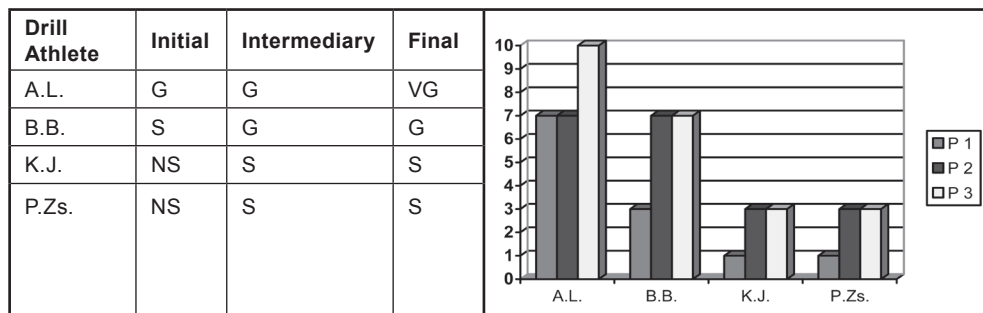
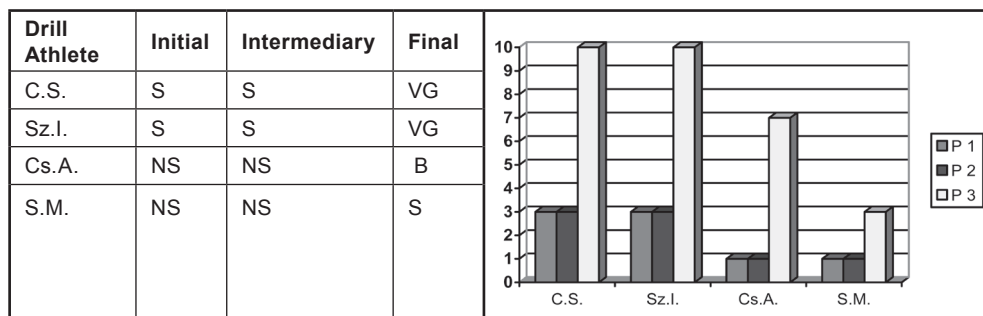


Table 7. Ratings for the three control drills - shooting range time

Control group



Experimental group



After analyzing the results of the two groups, following the training during the two stages, June - September, we can make several observations. The most important of these observations regard the shooting range actions.

Given the fact that biathlon is an individual event, including the relay being based on personal results, and its composition being based on the physical fitness of the athletes during the event, the general results tend to give a general idea of the individual training, of personal mobilization for attaining goals, and not in the least, of the athlete's focus in trying to attain optimum shooting range actions.

CONCLUSIONS

After interpreting the experiment results, we can conclude the following:

1. After conducting this research, analyzing the data, and interpreting the results obtained during the control drills, we can confirm that the final time can be improved through a more thorough training of the shooting range actions.

2. The athletes' presence during the training must have a rate as high as possible, while the „aimed” and „accomplished” ratio must be closer to 1 (100%).
3. The recorded data shows indisputably the critical importance that a willingness to perfect the training programme can have, as far as the actions of the athlete, from his/her entrance in the shooting range until his/her exit, are concerned.

As a final conclusion, we can say that where the biathlon, an individual and a team event (for the relay events, where the individual results count directly) is concerned, the athlete can improve his/her results only through a systematic and systemic analysis of all the possibilities for reducing the wasted time.

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ABSTRACT

In addition to the problems regarding the sliding, pushing, change in direction, etc., actions that can be remedied by numerous means of perfecting the basic technique of the athlete (the running, etc.), the specific shooting range actions play a decisive role in attaining top performance. We can say that the exercises presented in this paper led to an improvement of the total time during the event, and by default, of the time spent in the shooting range. After conducting this research, analyzing the data, and interpreting the results obtained during the control drills, we can confirm that the final time can be improved through a more thorough training of the shooting range actions.

Key words: *biathlon, shooting event, junior athlete*