



Coordination of regulated breathing regimes at the fire range of qualified biathletes of different types of competitive readiness

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Abstract

Objective of the study was to reveal the effectiveness of coordination of regulated breathing regimes (RBR) of qualified biathletes of various types of competitive preparedness with actions at the shooting range.

Methods and structure of the study. The basis of the experimental training of biathletes was the RBR, developed on the basis of seven complexes of breathing exercises (CBE). Qualified biathletes (CMS) were divided into four groups. Three experimental (EG): "generalists"; "racers"; "shooters" and control (CG) with nine athletes each, 36 in total. Shooting training with the use of CBE and RBR in the annual cycle was 74 hours.

Results and conclusions. The use of RBR in the shooting training of qualified biathletes, taking into account the type of competitive preparedness in the experimental groups, contributed to: coordination of the rhythm of shooting and breathing between shots; reduction of the total time at the turn; an increase in the speed and accuracy of shooting; increase the effectiveness of passing the firing line.

The developed regulated breathing regimes should be used in the shooting training of qualified biathletes, taking into account: the mechanisms of the impact of breathing exercises on the athlete's body; functional and physical condition during shooting; in accordance with the type of competitive readiness.

Keywords: *biathlon shooting, breathing capabilities, regulated breathing patterns, breathing exercise complexes, types of biathletes' competitive readiness.*

Introduction. An important condition for the high-quality performance of technical actions at the firing line is the control of breathing by biathletes during a shot [1-3].

However, the modern biathletes' sports training program at the stage of improving sportsmanship does not include training sessions aimed at expanding the individual respiratory capabilities of athletes that ensure the quality of the shot [3].

Obviously, in the light of the severity of this problem, it is necessary to pay due attention to improving the level of respiratory capabilities of biathletes with the help of special exercises that allow stabilizing motor actions during shooting and on the way to the firing line in competition conditions [1-3].

In this regard, there is a need for scientific substantiation and development of regulated breathing regimes in the shooting training of biathletes,

aimed at improving shooting skills in competitive activities.

It was assumed that the use of RBR in the shooting training of biathletes of various types of competitive readiness at the stage of improving sportsmanship will increase its effectiveness, based on the growth of functional readiness, coordination of breath control with the rhythm of shooting in competition conditions, individualization in the training of biathletes.

Objective of the study was to reveal the effectiveness of coordination of regulated breathing regimes (RBR) of qualified biathletes of various types of competitive preparedness with actions at the shooting range.

Methods and structure of the study. The basis of the experimental training of biathletes was the regulated breathing regimes developed on the basis of seven complexes of breathing exercises (CBE): in a



calm state; with breath holding; breathing with power; with aiming the front sight at the target; on an elevated movable support; in front of a mirror with weapons; breathing exercises of a relaxation nature, aimed at the formation of breathing control skills, the combination of breathing rhythms with motor actions in shooting and racing, in various modes of intensity of competitive exercises.

RBR: No. 1 Forced inhalations and exhalations. Deep breaths with forceful exhalations (loud). Free breathing; No. 2 Forced inhalations and slow exhalations. Slow deep breaths with voluntary exhalations. Free breathing; No. 3 Slow deep breaths in and out. Slow deep breaths with forced exhalations. Free breathing.

Experimental shooting training was carried out in the preparatory, competitive and transitional periods. The experiment involved qualified biathletes (CMS), who were divided into four groups. Three experimental (EG): “generalists”; “racers”; “shooters” and control (CG) with nine athletes each, 36 in total.

Results of the study and their discussion. The use by biathletes of various types of competitive readiness of breathing exercises complexes during functional shifts during shooting made it possible to identify the most effective: “shooters” - “breathing with force” and “on an increased movable support”; “racers” - “with pointing the front sight at the target”; “generalists” - “with pointing the front sight at the target” and “in front of a mirror with a weapon” (see table).

Influence of complexes of breathing exercises on the accuracy of shooting with a load

Breathing exercises	Shooting position	The dynamics of shooting after the application of breathing exercises								
		Shooters			Racers			Generalists		
		Intensity			Intensity			Intensity		
		130-140 bpm	150-160 bpm	170-180 bpm	130-140 bpm	150-160 bpm	170-180 bpm	130-140 bpm	150-160 bpm	170-180 bpm
№ 1	prone position	+	+	+	+	+	+	+	+	+
	standing position	+	+	+	+	+	+	+	+	+
№ 2	prone position	+	+	-	+	+	+	-	-	-
	standing position	-	-	+	+	+	+	+	-	-
№ 3	prone position	+	+	+	+	+	+	+	-	-
	standing position	+	+	+	+	+	+	-	-	-
№ 4	prone position	+	-	-	+	+	+	+	+	+
	standing position	+	-	-	+	+	+	+	+	-
№ 5	prone position	+	+	+	+	-	-	+	+	+
	standing position	+	+	+	-	+	-	+	-	-
№ 6	prone position	+	+	+	-	-	-	+	+	+
	standing position	+	+	+	+	-	-	+	+	+

+ - increase in shooting accuracy;

+ - maintaining shooting accuracy;

- - decrease in shooting accuracy.



Based on these data, three variants of regulated breathing regimes (RBR) were developed, used on the way to the firing line. The degree of their influence on the shooting results of biathletes of different types of competitive readiness is determined. The most favorable RBR in shooting exercises with a load have been identified:

- for “shooters” - RBR No. 1. It affects the center of respiration regulation, is aimed at: providing the body with oxygen in the optimal volume, due to the intensification of gas exchange processes in organs and tissues; reduces tremor;

- for “generalists” - No. 2. It is aimed at reducing the frequency of breathing during shooting and psychoregulation, contributes to the formation of psychological attitudes corresponding to shooting actions at the turn;

- for “racers” - No. 3. It helps to change shallow breathing into deep, reduce muscle tremors and control breathing, due to the regulation of respiratory gases and a decrease in mental.

As a result of the use of RBR by biathletes from the EG in the gym, shooting range, shooting range with technical training aids, an increase in the speed and quality of shooting was revealed.

Analysis of the biathletes' functional state by the end of the experiment revealed that the athletes from the EG, along with the athletes from the CG, improved their VC indices; MVL; VO₂ max; heart rate; samples of Stange, Genchi; decrease in tremor ($p < 0.05$). In the CG, a significant increase was found in BMD, HR in ANOT, Stange, Genchi tests ($p < 0.05$) (Fig. 1).

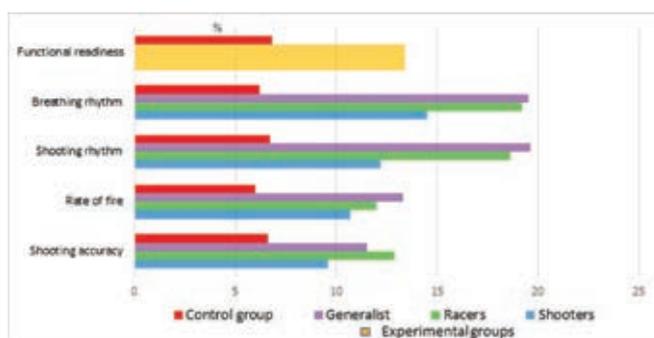


Figure 1. Growth of functional and shooting readiness indicators of qualified biathletes at the end of the experiment

In terms of breathing rhythm in shooting, rhythm of speed and shooting accuracy, biathletes from the EG «generalists», «racers» and «shooters» showed a higher level ($p < 0.05$), compared with biathletes from the CG ($p > 0.05$).

The use of breathing exercise complexes in the shooting training of qualified biathletes contributed to the reduction of the total time at the turn and the time to the first shot, the stabilization of the rhythm and quality of shooting in competition conditions, by coordinating breathing with motor actions at the turn (Fig. 2).

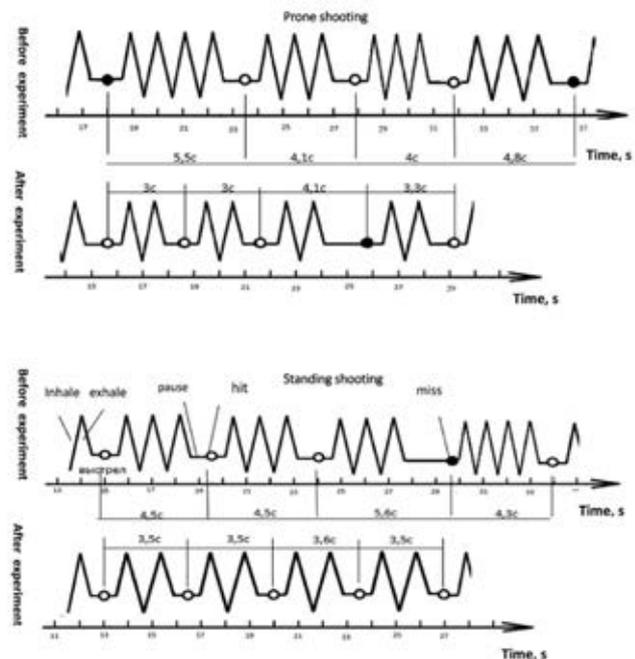


Figure 2. Biathlete EG shooting schedule in the sprint race (rollers)

At the end of the experiment, there was a reduction in: the preparation time to the first shot lying down by 2.5 s, standing by 2 s; time between shots up to 3-4.1 s lying down and 3.5-3.6 s standing; the number of respiratory cycles between shots up to two; time in a series of five shots by 7-8 s with a decrease in the number of misses. The time of motor actions of qualified biathletes at the turn decreased by 18.8%.

Thus, the developed regulated breathing regimes should be used in the shooting training of qualified biathletes, taking into account: the mechanisms of the impact of breathing exercises on the athlete's body; functional and physical condition during shooting; type of competitive readiness.

Conclusions. The use of regulated breathing regimes in the shooting training of qualified biathletes, taking into account the type of competitive readiness in the experimental groups, contributed to: coordination of the shooting and breathing rhythm between shots; reduction of the total time at the turn; an increase in the speed and accuracy of shooting; increase the effectiveness of passing the firing line.



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