

UDC: 796

DOI: 10.14526/2070-4798-2023-18-1-171-176

Influence of stress-factors on the anxiety level of highly-qualified racing skiers

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Abstract: In modern world of competitive period increase and its intensity high achievements sport claims high demands on psychophysical reserves of athletes and a steady long-term adaptation formation to physical loads. Psychological and physiological characteristics of athletes are formed from the external and internal factors influence on an organism. **Material.** The presented research work considers the influence of stress-factors on the level of highly-qualified athletes' anxiety. **Research methods:** scientific-methodical information sources analysis, pedagogical observation, questioning, pedagogical testing, pedagogical experiment, methods of mathematical statistics. **Scientific novelty** of the presented research work is in the fact that during the psychological testing among the athletes from the control and experimental groups we revealed different levels of anxiety connected with high level of competitions. In this connection the presented changes would influence prestart state of athletes and reflect their physiological and psychological peculiarities. **Results.** As a result of the experiment we came to the conclusion connected with anxiety level regulation depending on the amount of the influencing stress-factors on athletes' organisms during the training and competitive processes. According to the results of Spielberger-Hanin anxiety test and medical-biological test for cortisol concentration study all athletes have high or marked state of anxiety, as qualification increase in sport doesn't get rid of stress-factors influence. They have a negative influence on the effectiveness in main competitions. **Practical significance** is in the fact that the created by us methodology, qualified psychological training, correct reference points set by coaches and timely optimization of post loading rehabilitation can have a positive influence on athletes' results and prevent undesirable consequences of false start. **Conclusion.** The level of anxiety stabilization directly depends on a qualitative psychological training. Timely optimization of post-loading rehabilitation has a positive influence on general state of athletes.

Keywords: stress-factor, cortisol concentration, anxiety level, racing skiers, psychological state of athletes.

For citation: Yurij S. Vanyushin*, Olga V. Sannikova, Gulina K. Khuzina. Influence of stress-factors on the anxiety level of highly-qualified racing skiers. Russian Journal of Physical Education and Sport. 2023; 18(1): 142-146. DOI: 10.14526/2070-4798-2023-18-1-171-176.

Introduction

In modern world of competitive period and its intensity increase high achievements sport claims high demands on psychophysical reserves of athletes and a steady long-term adaptation formation to physical loads [10]. Psychological and physiological characteristics of athletes are formed from the external and internal factors influence on an organism [2]. Every day athletes face stress situations and very often stress-factors can disorientate skiers. The state of anxiety and uneasiness can have negative influence on the

effectiveness of the training and competitive processes [4]. That is why it is important to involve athletes into the state of tactical efficiency during the preparatory and competitive periods. Nowadays insufficient attention is paid to post-loading rehabilitation optimization and psychological training because of lack of qualified specialists in the sphere of sport medicine and psychology [6]. The level of competitive struggle during the main starts of the season increases and the person, who is able to control own emotions, will win. As Swiss skier Doris de Agostini said: "The race is won or

lost not on the track, but before the start, during psychological training" [7].

The aim of the research is theoretical and experimental substantiation of stress-factors influence on anxiety level of highly-qualified racing skiers.

Material and methods

The research was held on the basis of the Federal State Budgetary Educational Establishment of Higher Education "Volga region State University of Physical Culture, Sport and Tourism", the Republic of Tatarstan, Kazan, Russia. 20 racing skiers, who had "master of sport of Russia" qualification, took part in the research. We formed the control and the experimental group, each group included 10 people. The control group included athletes of the national cross-country skiing team of Russia. The experimental group included skiers. They were the members of the national teams of the Russian

Federation subjects. Both groups trained to take part in cross-country skiing Championship of Russia.

For the aim of the research achievement we analyzed scientific-methodical information sources, organized pedagogical observation, questioning, pedagogical testing, pedagogical experiment. The received results were handled with the help of mathematical statistics method.

Before psychological state of an athlete determination we used questioning method. It was directed toward the main stress-factors revelation. They influence the effectiveness of athlete during the training and competitive processes.

Results and discussion

We started the research from an oral questioning and comparative analysis of the main stress-factors during the training and competitive processes (Table 1).

Table 1

The results of an oral questioning and comparative analysis of the main stress-factors during the training and competitive processes

stress-factors during training process	stress-factors during competitive process
Self-doubt. Obsessive states and thoughts	Obsessive thoughts of loss during the main competitions
-	"Always the second" or "inconvenient opponents" syndrome
psychological tension when speaking about the lost competition, disease or trauma	negative influence of a coach or a team, or an opponent
Tense competitive atmosphere	negative influence of a coach or a team
-	Excessive concern about health state
"Self-awareness", the increasing isolation	Emotional burnout

Training and competitive activity of high-class athletes is connected with submaximal and maximal loads. They can lead to psychosomatic disorders [1]. It is important to use rehabilitation and psycho-regulating means and methods, when it is necessary, as a long-term influence of stress-factors creates non-stable psychological state. It is called anxiety or discomfort. Stress factors of the training and competitive processes analysis showed that the most wide-spread is "always the second" syndrome or "inconvenient opponents" syndrome. The same level is given to "compulsive idea not to be equal to coach's expectations".

In case of any stress situation limbic system of

central nervous system handles a signal, organizing emotional reaction and brain cortex controls and transforms it [9]. Balance is kept. However, if the situation comes out of the control, stressors start to accumulate and the balance can be disrupted. That is why in case of failure an athlete has some transformation at the somatic level. It is seen in an active or passive defense reaction. In both cases we can see the increased conflictness and the state of anxiety [5]. Table 2 presents the results of dependency analysis of a psychological and a functional state on the level of highly-qualified athletes' competitions.

Table 2

Dependency of a psychological and a functional state on the level of highly-qualified athletes' competitions

1.	Test/research	Republican competitions		All-Russian competitions		International competitions	
		EG	CG	EG	CG	EG	CG
I. Personal anxiety scale (point)							
1.	psychological Spielberger-Hanin test	22,80±,076	-	32,60±1,76	18,0±1,40	-	25,60±0,60
2.	Situational anxiety scale (point)	24,0±0,70	-	34,90±1,46	18,10±1,57	-	26,60±0,47
II. medical-biological research							
1.	studying the level of cortisol in saliva(μU/mL)-	20,91±0,29	-	30,77±0,96	23,06±0,93	-	26,27±1,16

During the psychological testing we revealed moderate anxiety level among the athletes from the experimental group, connected with high level of competitions. As a result of this, the level of cortisol increases. Hormone of glucocorticoids class, which protects an organism from stress, regulates the level of arterial pressure and adrenaline rush and takes part in the process of gluconeogenesis and metabolism [3]. In case of abundant production of cortisol we see aggressive behavior in a form of psychosomatic disorders or acute respiratory diseases.

Long-term level of anxiety has negative influence on prestart state. "Pre-start fever" causes metabolic processes intensification, energy resources use

long before the start. Long-term psychic tension would lead to misalignment during difficult for coordination movements fulfillment and general adaptive syndrome exhaustion [8]. We can suppose that there would be simple reaction transformation into difficult one. As it is known, the time of a difficult reaction is longer, than the time of a simple reaction.

Stress loads influence not only psyche, but also lead to changes at somatic level. These changes can lead to considerable tiredness and apathy, in some cases to serious trauma. A coach has to reveal such state and save an athlete from unnecessary consequences.

Table 3

Results of classical sprint (1600 m) in experimental and control groups

№	group	qualification(min)	quarterfinals(min)	semi - finals(min)	final (min)	difference between the last results
1.	EG	3:35.72	3:33.85	3:34.57	-	+0.72
	CG	3:31.18	3:32.23	3:28.98	3:32.19	+3.21
2.	EG	3:34.47	3:33.65	3:34.58	-	+0.93
	CG	3:34.12	3:34.53	3:30.58	3:33.07	+2.49
3.	EG	3:37.07	3:32.19	3:31.51	-	-3.54
	CG	3:35.42	3:34.18	3:29.04	3:34.32	+5.28
4.	EG	3:37.32	3:34.66	-	-	-3.14
	CG	3:35.32	3:36.18	-	-	-3.15
5.	EG	3:37.02	3:32.72	-	-	-0.84
	CG	3:37.98	3:35.34	3:35.58	-	+2.86
6.	EG	3:38.13	3:34.29	-	-	-2.79
	CG	3:31.27	3:35.13	-	-	+3.02
7.	EG	3:38.25	3:34.68	-	-	-3.12
	CG	3:39.09	3:36.82	-	-	-4.41
8.	EG	3:37.77	3:35.14	-	-	-0.95
	CG	3:35.20	3:36.04	-	-	-0.06
9.	EG	3:40.82	3:36.04	-	-	-4.72
	CG	3:37.85	3:36.15	-	-	-1.70
10.	EG	3:41.30	3:37.38	-	-	-3.92
	CG	3:38.27	3:35.21	-	-	-3.06

The athletes from the experimental and the control groups took part in cross-country skiing Championship of Russia. Our experiment provided results registration and comparison of the further classical sprint races, presented in table 3. Respondents № 7,8,9,10 from both groups showed the lowest results of general sampling, their time is 10.06 ± 1.25 s longer than the time of the leaders of the race. Passive state before the start or "pre-start apathy" influenced working capacity of racing skiers and as a result, sports result in general. After the influence of a competitive stress-factor the athletes were able to enter the phase of working, but only during quarterfinal race. Their results improved for 2.19 ± 0.50 s, but red group with relatively quick distance overcoming in a qualifying round also improved its time for 0.80 ± 0.46 s. Tense competitive situation also had a great influence on the effectiveness of athletes № 5 and 6 from the control group. The participants of the competitions had false start and got a warning. Skiers themselves commented on their state as "burned out at the start". Athletes № 4 and 5 from the experimental group had defense reaction at somatic level and they couldn't show high results. Among the leading group №1,2 and 3 we registered the cortisol level. It was 35% higher. It shows the level of adrenaline increase in blood. Athletes start to feel excessive agitation. It can transform into "pre-start fever" and it would lead to premature energy waste. Finishers of semifinal races, who missed qualifying for the final, got into the flow with "inconvenient opponents". During the final race we saw only the athletes from the national team of Russia. It shows highly-qualified psychological training level and correctly set reference points of the coaching staff.

Conclusion

1. According to the results of Spielberger-Hanin anxiety test and medical-biological test for cortisol concentration study all athletes have high or marked state of anxiety. As qualification increase in sport doesn't get rid of stress-factors influence. They have a negative influence on the effectiveness in main competitions.

2. The level of anxiety stabilization directly depends on qualitative psychological training.

3. Timely optimization of post-loading rehabilitation has positive influence on general state of athletes.

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Submitted: 20.02.2023

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