EFFECTS OF SPEED ENDURANCE TEST ON THE LEVELS OF CORTISOL AND TESTOSTERONE IN HANDBALL PLAYERS

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Abstract

Physical activity plays a key role in the control of neuroendocrine, autonomic and behavioral responsible for the physical and psychosocial stress. However, little is known about how levels of physical activity modulates the response to the stress caused by physical training. After a stressful event (physical exercise) level of cortisol rises, where cortisol like other glucocorticoid agents, has widespread effects which helps to restore homeostasis. Physical exercise also increases testosterone levels. Athletes often take androgenic steroids in an attempt to increase their strength. Studies show that men who used testosterone and practiced, have achieved decrease of fat and increase of muscle than in those men who did not use testosterone (Bhasin et al 1996). Although previous studies have shown that trained subjects exhibited significantly lower cortisol levels and heart pressure on the stress provouct by physical exercise, compared with untrained men, this paper shows that even trained athletes after physical exercise have increased levels of cortisol and testosterone.

Introduction

Although cortisol secretion as response to the stress of physical exercise is a natural function, prolonged secretion of cortisol, due to chronic stress can lead to significant physiological changes. Performing the test with maximum load is characterized by increased circulation of lymphocytes, as antibody response, and increased levels of cortisol (Cordova, Sureda, Tours & Pons 2010). Practice has shown that elite athletes show significantly lower

levels of cortisol, heart pressure and anxiety, compared with untrained subjects. Previous studies indicate reduced reactivity of the autonomic nervous system to psychosocial stress in trained individuals, and more importantly, the results indicate a differential effect on the level of physical activity in a variety of stress-related neurophysiological systems in response to psychosocial stress (Rimmele, Seiler, Marty , Wirtz, Ehlert & Heinrichs 2009). Testosterone has a potential anabolic effect on muscle-skeletal system, including an increase in lean body mass, dose related to hypertrophy of muscle fibers, and increase of muscle strength. For athletes requiring speed and strength and men who want cosmetic muscles, illegal steroids are a powerful lure, despite the risk of subjective side effects (Evans 2004). In a study published by the Sinar, Polat, Baltaci & Mogulkoc 2010, the authors concluded that the increase of testosterone is higher in people who exercise compared to people who do not exercise. As a conclusion from previous research it can be said that elite athletes have shown reduced reactivity to psychosocial stressors, specific lower adrenocortical, autonomic and psychological responses to stressful situations. These results suggest that physical activity can act as preventive care at the appropriate stress disorder that people encounter every day.

Material and methods

Sample of students. The sample was made up of 8.handball players of first federal league of Serbia. Testing was conducted in 2010. in Nis, Serbia. The average age of the handball players was 22 years, with the average sports serving of 8 years.

Sample of variables. To assess changes in adaptability the 7x35m speed endurance test (Bangsbo 2003) was used. The test is performed on a track length of 35m, which is marked with markers. The task is to overrun at highest speed given section in seven consecutive terms. After the first attempt, the examinee has 25 seconds to come to the starting point (light running), followed by a re-run.

The experimental procedure. Before starting the test and immediately after the test, the subjects were taken peripheral blood from a finger. After analysing the blood we came up with concentration of cortisol and testosterone, which should indicate the size of adaptability to change during the test. Blood analysis was performed at the Center for Medical Biochemistry of Clinical Center Nis.

Results

We have noticed an increase of cortisol and testosterone after the test 7x35m in a larger number of subjects. As the physical condition of individual character and thus of the respondents is noted that not all patients have increased parameters, which is a direct consequence of better well trained individual respondents.

Table 1. Reference values of cortisol and testosterone

REFERENCE VALUES	**Cortisol**	**Testosterone**

	171-526 umol	5-35 umol

Table 2. Levels of cortisol and testosterone on the initial and final measuring

	Cortisol								**Testosterone**							
Examinee	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Initial measuring	636	452.8	236.8	489.7	358.7	314.7	418.7	389.7	8.56	5.84	6.89	5.84	6.98	6.98	4.89	3.58
Final measuring 7x35m	625.8	389.7	589.7	698.7	398.7	429.8	512.8	489.7	6.54	6.45	4.58	3.41	7.45	11.25	6.89	4.58

From this display it can be concluded that only one examinee didn't have cortisol levels within normal limits, while two patients did not have the testosterone within normal limits.

Results obtained after taking the blood after the speed endurance test 7x35m, showed that the increase in cortisol levels occurred in 6 subjects, whereas the increase in testosterone levels occurred in 5 patients.

Discussion and conclusion

In a study published by Duke, Ruby, Daly & Hackney 2007, the authors examined the response of free testosterone and cortisol ratio (FTC) in prolonged exercise endurance. In the results that they got, they noticed that exercise caused an increase of cortisol, compared to the baseline levels of cortisol, followed by a rapid decline in the immediate recovery from exercise. The results also show that the ratio of the FTC responds to intense exercise, but the aspects of the response may be delayed as a recovery run. Based on the results obtained in testing handball players in Nis, although the examinees had sports experience of 8 years, it can be concluded that there was an increase of plasma cortisol and testosterone following a test of speed endurance 7x35m, which is explained as adaptatin of body during new physical state. The results we obtained confirm the results presented by Duke, Ruby, Daly & Hackney in their study in 2007. As a guideline we would like to note that scientists who want to monitor these parameters need to be aware that during the test, the time they choose to implement may affect the interpretation of the obtained data.

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