Correlation of overtraining psychic factors with Testosterone and Cortisol in men volleyball players

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ABSTRACT

The purpose of this study was to survey the Correlation of overtraining psychic factors with Testosterone and Cortisol in men volleyball players. Thirty men volleyball player (22 ± 2.01 year, 178 ± 5.3 cm, 75.64 ± 4.5 kg) from Tehran city, Iran were selected randomly and by using personal information questionnaire. All subjects had a minimum 3 years background of volleyball playing (3 sessions per week). From the subjects were asked to complete the overtraining questionnaire and gave three saliva samples (at 8 am, 11 am, and 5 pm) during a rest day. Concentrations of cortisol and testosterone in the saliva were determined by radioimmunoassay. The data were analyzed using the SPSS version 19.0 software. Correlations between hormonal data and the score obtained in the overtraining questionnaire were determined using the Spearman correlation coefficient. P value, (0.001) was considered significant. The results showed there were significant correlations between the questionnaire score and testosterone/cortisol concentrations at 8 am, 11 am and 5 pm hours. Also the correlations between overtraining questionnaire score and testosterone/cortisol were significant.

Key words: overtraining, psychic factors, testosterone, cortisol, volleyball players.

Introduction

Overtraining has for decades been one of the most popular topics in meetings and journals dealing with top-level sports [1]. A sustained and dramatic impairment of physical performance occurs in overtraining (OVTS) due to excessive exercise sessions (high intensity or high volume training) associated with inadequate recovery periods [2, 3]. In medical literature, the word "overtraining" has had many meanings [1]. It has been used to mean overload training, over-reaching, and overtraining syndrome [4, 1]. Overload training is commonplace in all athletes’ training regimens and acts as appropriate stimuli for the body to adapt and super compensate thus leading to improved performance. Overtraining syndrome (OTS) is characterized by a sports-specific decrease in performance together with disturbances in mood state [5]. OTS corresponds to a loss of adaptability resulting in a well-known symptomatology: deterioration in performance, difficulty training and an absence of motivation, behavioral disorders (irritability, melancholy), sleeping disorders, difficult recovery, an increased occurrence of muscular accidents, and higher sensitivity to infections [6]. There have been a number of studies reporting changes in a variety of physiological and biochemical responses to intensified training; however, it is necessary to differentiate between those studies that have induced a decline in performance, [7, 8, 9, 10, 11, 12]; those that did not [13, 14, 15]; and those that have either failed to measure or did not report performance changes [16, 17, 18]. Self reports of fatigue after training may allow overtraining to be monitored [19]. The French consensus group on overtraining of the Societe de Me decine du Sport has proposed a new standardised questionnaire of early clinical symptoms of this elusive syndrome, allowing the calculation of a score that may help to indicate the level of tiredness in sportsmen carrying out a heavy training programme [20]. This score appears to correlate with indications of muscular damage (creatine kinase, myosin) and some haematological variables (blood viscosity, packed cell volume, plasma viscosity, ferritin) [21,22]. Laboratory methods that are currently used to study the effect of exercise on the body are often costly and require a lot of time. These methods are not always usable. However, few studies have shown a relation between
the overtraining psychic factors and hormonal changes especially in the volleyball players.

Materials and Methods

Thirty men volleyball player (22 ± 2.01 year, 178 ± 5.3 cm, 75.64 ± 4.5 kg) from Tehran city, Iran were selected randomly and by using personal information questionnaire. All subjects had a minimum 3 years background of volleyball playing (3 sessions per week). From the subjects were asked to complete the overtraining questionnaire and gave three saliva samples (at 8 am, 11 am, and 5 pm) during a rest day. Concentrations of cortisol and testosterone in the saliva were determined by radioimmunoassay. For comparison of Testosterone and Cortisol before/after overtraining was used from t test. The data were analyzed using the SPSS version 19.0 software. Correlations between hormonal data and the score obtained in the overtraining questionnaire were determined using the Spearman correlation coefficient. P value, 0.05 was considered significant.

Results and Discussion

Results of table 1 show that Testosterone was before and after overtraining (sequentially 680.46, 350.13) and cortisol was before and after overtraining (sequentially 18.36, 24.90). Therefore with regarding P value (0.001) in both variable appears volleyball players protocol led to overtraining and statistically were significant.

The results table 2 show there were significant correlations between the questionnaire score and testosterone and cortisol concentration at 8 am, 11 am and 5 pm hours; Accordingly Also the correlations between overtraining questionnaire score and testosterone/cortisol were significant.

| Table 1: The comparison of Testosterone and Cortisol before/after overtraining men volleyball players. |
|--------------------|-------|-----|----------|
|                    | Mean  | t    | p        |
| Testosterone       |       |      |          |
|                    | Before overtraining (normal) | 680.46 | 18.61   | 0.001 |
|                    | After overtraining           | 350.13 |         |       |
| Cortisol           |       | -15.55 | 0.001   |
|                    | 24.90 |       |          |

| Table 2: Correlation between overtraining questionnaire score with Cortisol and Testosterone. |
|----------------------|--------|-----|----------|
|                      | r      | P value |
| overtraining psychic factors | 0.86  | 0.001 |

Conclusion:

The purpose of this study was to survey the correlation of overtraining psychic factors with testosterone and cortisol in men volleyball players. Many indicators have been proposed to characterise haematological, physiological, and psychological symptoms that indicate a state of overtraining [23, 24,25]. Overtraining syndrome is a neuroendocrine disorder characterized by poor performance in competition, inability to maintain training loads, persistent fatigue, reduced catecholamine excretion, frequent illness, disturbed sleep and alterations in mood state [26]. The following up of some hormonal parameters during the professional soccer training process could be one of the indicators of the training effects. On the other hand, overreaching and overtraining as an opposite adaptation of supercompensation could be detected by following up some hormonal changes [27]. The results of this study supports by Maso et al (2004), Marita (2003) Assarzadeh (2011) and Handziski (2006) that shown cortisol and Testosterone concentrations was found to be related to the score obtained in the overtraining survey. Also some of studies noted a significant positive correlation between the testosterone/cortisol ratio and the score [28,29].

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References


