SALIVARY CORTISOL AND A-AMYLASE REACTIVITY TO TEAKWONDO COMPETITION IN ADOLESCENTS

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Introduction

Originating from a Korean martial art taught for warfare and self-defence, the Olympic sport Taekwondo attributes points mainly to kicks directed to the torso or the head of the opponent (Kazemi et al., 2006). Competing in three 3-minute-rounds with 1 minute-recovery between rounds, Taekwondo athletes have to be determined and psychologically prepared to physically attack and defend their opponents. Studying the adolescent aggressive behaviour, Gordis et al. (2006) claimed that salivary cortisol and alpha-amylase (A-A) serve as a non-invasive measure of the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenal (HPA) axis activity in stressful situations. Thus, the aim of this study was to evaluate the influence of the physical stress of the taekwondo competition on salivary A-A and cortisol in young athletes.

Methods

Six female (13±1 yrs) and 10 male (14±0 yrs) young taekwondo athletes gave a saliva sample (Salivette, Sarstedt, DE) in the morning (9:00 hr), immediately before and after their taekwondo competition, and at 30 and 90 min of the recovery period. Saliva samples were analyzed (mQuant, BIOTEK, USA) using kinetic reaction assay for A-A and ELISA method for free cortisol (Salimetrics, USA). A 5 (Sampling) x 2 (Gender) x 2 (Sport Achievement) ANOVA for repeated measures was applied to verify statistical differences (p<0.05).

Results

No differences emerged for gender and sport achievement. Significant differences for Sampling emerged for both cortisol (p<0.01) and A-A (p<0.05). A-A peak values were found immediately after the competition (277.8±45.2 U/ml) and already at 30 min of the recovery phase values (117.18±16.32 U/ml) were not significantly different from basal ones (89.90±11.88 U/ml). Cortisol peak values (40.32±13.31 nmol/L) emerged at 30 min of the recovery phase and at 90 min of the recovery phase were lower (14.62±8.73 nmol/L) than baseline (26.57±16.74 nmol/L).

Conclusion

The significant rise of post-competition cortisol and A-A values showed that Taekwondo competitions impose a high physical and emotional stress on athletes. In agreement with the literature on cortisol and A-A reactions to social stressor in adolescents (Gordis et al., 2006), different reaction profiles emerged also in response to the physical stressor, consistently with the faster reactivity of the SNS relative to the HPA axis. In fact, salivary A-A peaked immediately post-competition and returned to baseline already at 30 min of the recovery phase, indicating the sudden orthosympathetic reactivity to the combat match, while the delayed cortisol peak values could be related to the metabolic needs of the exercise. On the other hand, the lack of significant difference between winners and losers might be due to both the limited number of athletes and/or to their ability to cope with the stress associated to the sport achievement.

References

Gordis et al. (2006) Psychoneuroendocrinology 31, 976–987

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