

ENDOCRINE RESPONSE TO SMALL-SIDED GAMES AND MATCH PLAY IN ELITE U19 SOUTH AFRICAN SOCCER PLAYERS

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Introduction Small-sided games (SSGs) can be used with the intention of stimulating physiological adaptations in players that are specific to match demands. Very few studies are aimed at measuring the internal response to these SSG activities. The endocrine response to SSGs and matches in soccer is less well known although the respective hormones; cortisol, testosterone and dehydroepiandrosterone (DHEA) provide a valid measure of training load and total stress in several other methods of exercise. This study aimed to measure the endocrine response to SSGs and matches and identify any variations between playing position and if SSGs were preparing players for match demands.

Methods 22 elite male soccer players (16 – 23 years old), divided into subcategories of goalkeeper (n = 4), defender (n = 7), midfielder (n = 5), and attacker (n = 6) provided saliva samples; at rest, in response to 11v11, 7v7, and 4v4 SSGs, friendly and competitive matches, and a yoyo level two intermittent endurance test (YoyoII). Cortisol, testosterone, T:C, and DHEA concentrations were analysed using an ultra-high-performance liquid chromatographic method with mass spectrometric detection. Statistically, hormones were analysed through one and two way ANOVA's to compare different time points and positions. **Results** Cortisol (ng/ml) increased significantly ($0,70 \pm 0,40$ SD to $3,94 \pm 3,26$ SD) from resting values in response to competitive match-play immediately after the match amongst the squad as a whole ($p < 0.01$). Cortisol increased significantly during all small-sided games ($p < 0.05$). T:C ratio (ng/ml) significantly decreased ($0,89 \pm 1,93$ to $0,19 \pm 0,28$) from resting values in response to match-play ($p < 0.01$) while testosterone showed no significant changes. No significant differences were found between the endocrine response of all positional subgroups over any SSGs or matches. DHEA presented no significant changes between all time-points and T:C ratio remained constant throughout the eight month testing period. Yoyo2 produced comparable endocrine response to those at rest amongst the squad as a whole.

Conclusion SSGs do not stimulate the same stress response as matches. The stress response could be more than just physical exertion, therefore cortisol may be used as an indicator of total stress as opposed to physical stress alone. Different positions do not result in different internal responses to training and matches regardless of differing external positional requirements. SSGs as a method of training seems to present no risk of overtraining. Future studies should seek to correlate cortisol, testosterone and DHEA with other, more affordable measures of internal training load or be used in conjunction with external training load measures.

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