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RELATIONSHIP BETWEEN SALIVARY BIOMARKERS AND EXTERNAL LOAD DURING A PROFESSIONAL MEN'S BASKETBALL GAME

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INTRODUCTION:
In sports science, external load (EL) refers to the amount of physical work completed by the athletes, while internal load represents an individual physiological response to the amount of work completed during a training session. In response to a single bout of strenuous exercise, testosterone (T), as a hormone associated with anabolic processes, is likely to experience a slight increase or decrease. Alternatively, cortisol (C), as a hormone that works antagonistically to T, is likely to experience a considerably greater increase. When expressed as a testosterone-to-cortisol ratio (T/C), these two hormones serve as a viable measure of the athlete's recovery status. Thus, the purpose of this study was to examine the relationship between EL experienced by basketball players during a game and T, C, and T/C.
METHODS:
Six professional male basketball players ($\bar{x}$±SD; hgt=191.8±11.9 cm, wgt=19.2±14.4 kg; age=28.3±2.2 yrs) volunteered to participate in the present study. After arrival at the gym (12:00h), each participant wore an EL monitoring system composed of compression shorts and a tri-axial accelerometer (StriveTech, Bothell, WA, USA) sampling at 1000 Hz. Upon completion of the warm-up procedure, consisting of a set of dynamic stretching exercises and 15 min of partner shooting, participants proceeded with playing a simulated 5x5 basketball game (4x10 min quarters with Elam Ending). By holding an oral swab (Salimetrics, State College, PA, USA) sublingually in their mouth for 2 min before releasing it into a centrifuge tube, all participants simultaneously provided salivary samples post first (P1Q), second (P2Q), third (P3Q), and fourth (P4Q) quarter. A separate enzyme-linked immunosorbent assay was used for each hormone and all samples were ran in duplicates. Intra- and inter-assay variances for T and C were 5.6% and 5.1%, and 6.2% and 6.9%, respectively. Pearson product-moment correlation coefficients were used to measure the strength of linear regression ($p<0.05$).
RESULTS:
The average EL, T, C, and T/C values were 0.450±0.162 [arbitrary unit], 0.954±0.257 [nmol/L], 14.264±6.411 [nmol/L], and 0.076±0.006 [ratio], respectively. Statistically significant correlations were observed between EL and C ($r[22]=0.751$, $p<0.001$; $R2=0.564$), and EL and T/C ($r[22]=-0.729$, $p<0.001$, $R2=0.531$). Despite a tendency to display a weak positive association, the correlation between EL and T did not reach a significance level ($r[22]=0.371$, $p=0.075$, $R2=0.138$).
CONCLUSION:
Overall, the findings of the present study reveal a strong positive relationship between EL and C, and a strong negative relationship between EL and T/C. Although further research pertaining to position-specific differences is warranted, we can conclude that as the amount of physical work completed by the athlete during a basketball game increases, the C tends to follow the same pattern. However, T/C, as an indicator of athletes' recovery status, tends to display an inverse trend and progressively decreases throughout a game span.

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