

The Effect of Repeated 40 Meter Sprint Trials on Salivary Cortisol in Elite Youth Female Soccer Players

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ABSTRACT

The outcome of an intense exercise session is a stress response, potentially resulting in an increase in circulating cortisol. The acute cortisol response due to intense exercise may vary when comparing elite youth athletes and may not be noticeable in athletic performance. **PURPOSE:** The purpose of this study was to compare salivary cortisol responses between older (17-19 yo) and younger (11-13 yo) elite female soccer players after repeated 40m sprint trials. **METHODS:** All participants (n=8) were current United States Soccer Federation Development Academy players. Participants were placed into young (n=4, mean \pm SD; age 12 ± 0 yrs; weight 48.3 ± 10.0 kg) and older (n=4, mean \pm SD; 17 ± 1 yrs; weight; 60.2 ± 7.1 kg), and completed 3 trials. The control day (CON) consisted of collection of 2ml saliva samples at 0, 30 and 60 min, while participants sat quietly. Sprint Day 1 (SD1) and Sprint Day 2 (SD2) consisted of collection of a baseline saliva sample prior to sprinting, followed by ten 40m sprints with 30 seconds rest between sprints. On SD1 and SD2, additional saliva samples were then collected, immediately, 15, 30, 45, and 60 min following the last sprint. Sprint time (ST) was also recorded for each 40m sprint. Salivary cortisol (S_C) levels were determined through enzyme-linked immunosorbent assay (ELISA) with sensitivity range $<0.007 \mu\text{g}/\text{dL}$. A two-way mixed design repeated measures ANOVA ($p < 0.05$) was used for statistical analysis of incremental area under the curve (AUC). **RESULTS:** There was a significant overall interaction between age and treatment days ($F(2,12) = 4.586, p=0.033$). An increase from CON to SD1 in the young group S_C AUC (65.69%) was followed by an increase from SD1 to SD2 (46.66%). The older group increased S_C AUC from CON to SD1 (157.52%) but decreased from SD1 to SD2 (-25.28%). There was a significant interaction between age and S_C AUC ($F(1,6) = 11.521, p=0.015$) from SD1 and SD2. Additionally, ST did not significantly change, on either day, from sprint 1 to 10 in either group ($F(1,6) = 1.075, p=0.34$). **CONCLUSION:** The salivary cortisol response appears to differ in these elite athletes. Based on S_C , the stress response in the mature youth athletes appears to decline, where the younger youth athlete appears to have an increase in the stress response to repetitive intense exercise. The physiological responses may not be outwardly observable as athletic performance, as sprint time values did not differ between the groups. It is acknowledged that this study was limited by a small sample size.