



Mid Atlantic Regional Chapter of the American College of Sports Medicine

Annual Scientific Meeting, November 2nd - 3rd, 2018
Conference Proceedings
International Journal of Exercise Science, Issue 9, Volume 7



An Examination of Physiological Responses in EMT Students During Occupational and Heat Stress

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PURPOSE: The purpose of the present study is to observe the impact of a hyperthermic environment on physiological responses in EMT students performing a simulated occupational task. **METHODS:** Ten EMT students reported to the lab for a familiarization session and maximal exercise test to determine proper intensity for subsequent trials. Participants rested 48 hours between sessions. Experimental condition was assigned in counterbalanced fashion; a thermoneutral environment, or hyperthermic condition (100°F, 60-70% RH). Baseline values were assessed outside of the environmental chamber and again immediately upon entering for the following dependent variables; heart rate (HR), mean arterial pressure (MAP), rating of perceived exertion (RPE), oxygen consumption (VO_2), thermal sensation (TS), core temperature (T_c), mean skin temperature (MST), and mean body temperature (MBT). Following 30 minutes of acclimation participants completed an aerobic bout of exercise followed immediately by an anaerobic bout of exercise. This process was repeated for a total of two aerobic bouts of exercise, and two anaerobic bouts of exercise. The aerobic exercise consisted of a 10-minute treadmill walk at 70%-80% of their previously determined maximal heart rate. The anaerobic exercise consisted of lifting a 50 lb. sandbag to a metronome over the course of 5 minutes, until 15 lifts were successfully completed. Upon completion of the final sandbag lift, participants exited the chamber for a ten-minute passive recovery to conclude the protocol. **RESULTS:** A two condition by nine time point analysis of variance (ANOVA) was conducted on all dependent variables. Post hoc analysis via paired samples t-test were conducted to further explain all main effects and interactions. A main effect of time was found for HR ($p = 0.006$), MAP ($p = 0.024$), RPE ($p = 0.035$), VO_2 ($p = 0.009$), TS ($p = 0.051$), T_c ($p = 0.022$), MST ($p = 0.000$) and MBT ($p = 0.003$). A main effect of condition was found for HR ($p = 0.001$), RPE ($p = 0.004$), TS ($p = 0.000$), T_c ($p = 0.033$), MST ($p = 0.015$) and MBT ($p = 0.010$). A significant time by condition interaction was seen in TS ($p = 0.043$) and MST ($p = 0.033$). **CONCLUSION:** Future research should emphasize a focus on maintaining a lower core and skin temperature under occupational and heat stress in order to improve physiological and motor performance.