
A-37 Free Communication/Poster - Occupational Physiology

MAY 30, 2012 7:30 AM - 12:30 PM
ROOM: Exhibit Hall

1404 Board #185 MAY 30 11:00 AM - 12:30 PM

Daily Aspirin Therapy Does Not Increase Body Core Temperature Responses in Firefighters During Exertion in Thermal Protective Clothing

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(No relationships reported)

Heart attack is the most common cause of line-of-duty deaths in the fire service. Daily aspirin therapy is a common preventative measure used to reduce the morbidity of heart attacks in the general population. However, the mechanism of aspirin can hypothetically impair thermoregulation and anecdotal reports have suggested aspirin use increases the risk of heat illness. In spite of these observations, the safety profile of aspirin during uncompensable heat stress has not been well described.

PURPOSE: Determine if fourteen days of daily aspirin therapy (81mg PO) alters body core temperature responses during exertion in the heat while wearing thermal protective clothing (TPC).

METHODS: In this double-blind, placebo controlled study, 102 firefighters were randomized to receive either 14 days of aspirin (N=54) or a placebo (N=48) prior to completing a 50 minute bout of treadmill exercise in the heat (38.9±1.1°C; 24±7% RH) while wearing TPC and self contained breathing apparatus. Heart rate, weighted mean skin temperature, and body core temperature were monitored throughout the 50 minutes of exercise.

RESULTS: There were no differences in age, height, mass, BMI, or VO₂max between groups. Heart rate at the end of exercise did not differ between aspirin and placebo groups (174±17 vs. 171±17 bpm, respectively). In the aspirin group, baseline core body temperature was 37.1±0.3°C, which was similar to the placebo group (37.2±0.5°C; p=0.55). Maximal body core temperature was 38.7±0.5°C in the aspirin group and 38.6±0.5°C in the placebo group (p=0.39). The percent change in core temperature from baseline was 4.3±1.2% in the aspirin group and 3.9±1.6% in the placebo group (p=0.20). Upon completion of exercise, maximal weighted skin temperature was 38.3±0.5°C in the aspirin group and 38.1±0.6°C in the placebo groups. Skin temperature rose 12.5±2.3% from baseline in the aspirin group and 12.2±2.6% with the placebo (p=0.55).

CONCLUSIONS: Fourteen days of aspirin therapy does not alter temperature responses among firefighters performing exertion in the heat.

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Physiological and Thermoregulatory Responses to Wearing N95 Filtering Facepiece Respirators

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(No relationships reported)

The use of filtering facepiece respirators (FFR) has increased enormously in both public and occupational sectors for respiratory protection from infectious airborne particles. The N95 class of FFR, which filters out at least 95% of airborne particles >0.3 µm, is the most common type of FFR; however, there has been a lack of scientific information on physiological and thermal burdens of wearing N95 FFR.

PURPOSE: To investigate physiological and thermoregulatory responses to wearing N95 FFRs while performing low-moderate intensity exercise.

METHODS: Twenty healthy subjects (13 men, 7 women), who passed a physical examination and a respirator quantitative fit test, performed three trials of treadmill exercise (5.6 km/h, 0% grade, 60min duration) in a thermoneutral environment (21.4±0.7°C, 23.5±7.9%) while wearing two popular styles (cup-shaped and flat fold) of N95 FFR or not wearing FFR for control (CON). Study variables included core body temperature (T_{co}), skin temperature at the cheek (T_{cheek}) and abdomen (T_{abdomen}), heart rate (HR), respiratory rate (RR), transcutaneous carbon dioxide (tcPCO₂), and oxygen saturation (SpO₂). Dead-space microclimate temperature and humidity were also measured in FFR trials. Data were analyzed by two-way (Trials × Time) repeated measures ANOVA.

RESULTS: T_{co}, T_{cheek}, and T_{abdomen} rose significantly by time in all trials (p<0.001) and the final dead-space microclimate temperature and humidity reached up to 33°C and 90%, respectively. However, there was no statistical difference in these temperature variables between CON and the FFR trials. HR and RR increased significantly by time in all trials (p<0.001), but at a greater rate in the FFR trials than in CON (HR; P<0.001, RR; P<0.01). There was no statistical difference in SpO₂ levels between CON and FFR trials, however, tcPCO₂ levels were significantly higher in the FFR trials than in CON (p<0.001).

CONCLUSION: Wearing N95 FFR while performing low-moderate work for 60 min in a thermoneutral environment did not impose a significant thermal burden on the wearer. However, significantly elevated HR and RR in the FFR trials indicated that wearing N95 FFR may add additional metabolic demands. Also, breathing through N95 FFR did not interfere with SpO₂, but caused some mild degree of CO₂ retention (tcPCO₂ ≥ 45 mmHg).

1406 Board #187 MAY 30 11:00 AM - 12:30 PM

Increased Salivary Cortisol and State Anxiety Levels in Firefighter Candidates during Repeated Fire Suppression Tasks

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(No relationships reported)

Research suggests that the combined psychological and physiological stress load of firefighting may contribute to an exacerbated cortisol response during fire suppression.

PURPOSE: The purpose of this study was to examine the salivary cortisol (SCORT) response in firefighter candidates during simulated fire suppression tasks.

METHODS: Twelve firefighter candidates (age = 25.25 ± 5.69) participated in two research sessions, an informational session during which consent and demographic/psychometric data were obtained, and a second session in which the candidates completed two fire suppression evolutions. In each evolution, the participants entered the burn building in pairs and undertook fire suppression tasks. Baseline measures of SCORT and state anxiety (SAI) were collected immediately prior to each evolution, and collected again within 5 minutes of completion of each evolution.

RESULTS: The fire suppression tasks resulted in elevated SCORT levels (when controlling for participant order) compared to baseline in both evolution 1 and 2 (t = 11.27, p = 0.004 and t = 44.07, p = 0.000 respectively). Anxiety levels also increased but did not reach significance in evolution 1, and increased significantly in evolution 2 (t = -2.66, p = 0.026).

CONCLUSIONS: These findings suggest that the candidates experienced both physical and psychological stress in both evolutions. Further, findings suggest that the experience of the first evolution did not reduce the psychological stress and the resultant physiological load of the second evolution.

1407 Board #188 MAY 30 11:00 AM - 12:30 PM

Review of Current Minimum Riding Weights in Australian Horse Racing - Implications for Jockey Health and Wellbeing

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(No relationships reported)

Despite the international popularity of horse racing there is a dearth of population specific research available describing the physiological demands and health and lifestyle characteristics of jockeys. Given the weight-restricted nature of horse racing, jockeys often engage in extreme and unhealthy weight-loss practices, which are likely to place riders at an increased risk of injury. As a consequence, the Australian Racing Board (ARB) commissioned a scientific review of the minimum riding weight for flat jockeys.