TACSM Abstract

Quantifying the Chronic Thermoregulatory Adaptations in Hot Repair Work Team Members at Vitro Architectural Glass

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ABSTRACT

Extended exposure to elevated temperatures and thermal conditions or environments can lead to extreme elevations in the body's core temperature, heart rate, heat perception, and sweat loss. Subsequently, this leads to a decrease in physical mobility, cognitive function, and alertness, therefore, negatively impacting work efficiency and safety. Due to the demands of their job, members of the hot repair team at Vitro Architectural glass are exposed to high (140 to 160°F) ambient temperatures and physically demanding work on a regular basis. These conditions make normal working activities incredibly challenging, and have resulted in heat related illnesses (HRI) in the past. **PURPOSE**: The purpose of this study was to gain an understanding into the physiological response within members of the hot repair team at Vitro Architectural Glass. Using the results of the study researchers and safety officers at Vitro may be better able to recommend hydration, nutrition, heat exposure, and cooling strategies for team members in an effort to reduce the likelihood of HRI occurrence within the team. **METHODS**: All four male members (age = 34.3 ± 4.8 yrs., height = 176.2 ± 3.6 cm, weight = 95.5 ± 12.9 kg, BMI = 30.4 ± 2.9 kg/m^2) of the hot repair team took part in this observational study. Core body temperature and heart rate were recorded over a single 8-hour work shift, with data collected for all team members on the same day. Upon completion of their work shift, all members completed a sweat analysis test using Gatorade GX Sweat Patch. Sweat collection was completed with participants walking in the general proximity to their working space with ambient temperatures ranging from 114°F to 126°F for 20 min. **RESULTS**: Throughout the course of their 8-hour work shift hot repair team members were exposed to temperatures ranging from 140-160° F for 3.36 ± 0.3 hours, which resulted in an average heart rate of 121 ± 6.9 b/min. during active work. Despite the harsh working conditions core body temperature only saw an increase from 98.6° ± 0.2° F to 100.6° ± 0.3°. Results of the sweat analysis saw an average sweat rate of 66.3 ± 1.8 oz / hour across hot repair team members. **CONCLUSION**: Based on the results of the study, it appears that members of the hot repair team are well acclimated to heat stress through their ability to maintain safe core body temperatures throughout their shift with the highest recorded core temperature being 101.1°F. The likely mechanism for this is via the large observed sweat rates (68.75 ± 2.68 oz/hr). Given this information, proper hydration and electrolyte replacement may be the primary mechanism to reduce the likelihood of HRI occurrence.