

USE OF SALIVARY OSMOLALITY TO ASSESS DEHYDRATION

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ABSTRACT

PREHOSPITAL EMERGENCY CARE 2012;16:128–135

Objective. To investigate the ability of salivary osmolality to assess dehydration while subjects perform alternating work/rest cycles in personal protective equipment (PPE).

Methods. Eight healthy men (mean \pm standard deviation age: 23.5 ± 4.9 years; body fat: $17.8\% \pm 5.0\%$; maximum volume of oxygen consumption [VO_{2max}]: 57.2 ± 5.5 mL \cdot kg $^{-1}\cdot$ min $^{-1}$) performed two exercise trials: one while wearing shorts and a T-shirt (EX) and one while wearing firefighting PPE (EX+PPE). Saliva samples were taken before exercise, at minutes 40, 80, and 120 of the exercise trial, and during recovery. **Results.** Percent body mass loss (BML) was significantly greater while the subjects were wearing PPE ($2.18\% \pm 0.54\%$ vs. control $0.81\% \pm 0.30\%$). Salivary osmolality increased significantly in both trials (73.4 ± 12.4 to 125.1 ± 30.3 mOsm \cdot kg $^{-1}$ and 70.1 ± 12.5 to 83.6 ± 17.7 mOsm \cdot kg $^{-1}$); however, the increase in the EX+PPE trial was significantly greater than the increase in the EX trial. Plasma osmolality did not change significantly in either trial, whereas urinary osmolality increased significantly in both trials. Changes in salivary osmolality were strongly correlated with percent BML ($r = 0.80$; $p < 0.01$). **Conclusion.** Salivary osmolality may be a sensitive indicator of moderate dehydration under carefully controlled conditions. **Key words:** exercise; heat; dehydration; osmolality; saliva; personal protective equipment