

QUANTIFYING DEHYDRATION IN THE FIRE SERVICE USING FIELD METHODS AND NOVEL DEVICES

Gavin P. Horn, PhD, Jacob DeBlois, BS, Inga Shalmyeva, BS, Denise L. Smith, PhD

ABSTRACT

Objective. This study reports measurements of hydration status among firefighters prior to training, documents changes in hydration status after prolonged firefighting training, and reports the utility of salivary measurements to assess changes in hydration in field environments. **Methods.** Nude body mass measurements as well as urinary and salivary measurements of hydration status were taken before and after approximately three hours of firefighting training activities. Initial hydration status was assessed via urinary and salivary measures. Changes in body mass and total body water were measured following firefighting activity and correlated with changes in urinary and salivary measures of hydration. **Results.** The most important findings of this study were that a high percentage of firefighters arrived at training in a significantly or seriously dehydrated state; that firefighters lost a significant amount of body mass because of firefighting operations; and that portable salivary osmolality measurements showed much stronger correlation with changes in hydration status after firefighting operations than standard urinary measurements did. **Conclusions.** Firefighters arriving in a dehydrated state are at risk for heat injuries and may be in a physically and/or psychologically compromised state at the outset of firefighter training. Even during cool autumn days with ample fluids available, firefighters experience dehydration during typical firefighting activities, so the ability to measure hydration status throughout such activities may be important. Our data suggest that quantification of changes in hydration status through salivary osmolality measurements may provide a viable field measurement tool for such activities. **Key words:** hydration; rehabilitation; firefighter; salivary osmolality