

FOCUS ON FIREFIGHTER PHYSIOLOGY

PHYSIOLOGICAL RECOVERY FROM FIREFIGHTING ACTIVITIES IN REHABILITATION AND BEYOND

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ABSTRACT

Objectives. The primary objective of this study was to document the timeline of physiologic recovery from firefighting activities in order to inform emergency medical services (EMS) of vital sign values that might be expected during incident rehabilitation and in developing rehabilitation protocols to make decisions about when to return personnel to the fireground. Secondly, we compared two different incident rehabilitation strategies to determine effectiveness in reducing physiologic strain following firefighting. **Methods.** A repeated-measures randomized crossover design was utilized in which firefighters conducted a controlled set of firefighting activities, after which they completed incident rehabilitation in one of two conditions: 1) similar to currently used rehabilitation protocols and 2) with active cooling and nutritional intervention. Following 15 minutes of rehabilitation, each firefighter was asked to perform a simulated rescue “dummy drag” and then recover for 120 minutes in a quiet area. Core temperature and heart rate were recorded throughout the study. Blood pressures and subendocardial viability ratios were obtained before firefighting, after firefighting, and at standardized times during rehabilitation and

recovery. **Results.** Heart rate and core temperature increased during firefighting, and core temperature continued to increase for 7 minutes after completion of firefighting activities. These values did not return to baseline until at least 50 minutes after firefighting activity. Systolic blood pressures were significantly reduced during rehabilitation (15.2%), and recovered 7.7% during the first 50 minutes of recovery, but remained significantly lower than before firefighting for at least 120 minutes. An index of subendocardial perfusion was also significantly depressed for up to 110 minutes after firefighting. Differences between rehabilitation protocols were minimal. **Conclusions.** The timeline for recovery from firefighting activities is significantly longer than the typical 10–20-minute rehabilitation period that often is provided on the fireground. Modifications from the current rehabilitation protocol do not appear to improve the recovery timeline when rehabilitation is conducted in a cool room. While firefighters often are concerned about elevated blood pressures, this study suggests that firefighters and EMS personnel should also be cognizant of the potential dangers of hypotension. **Key words:** rehabilitation; blood pressure; body temperature; heart rate; firefighter