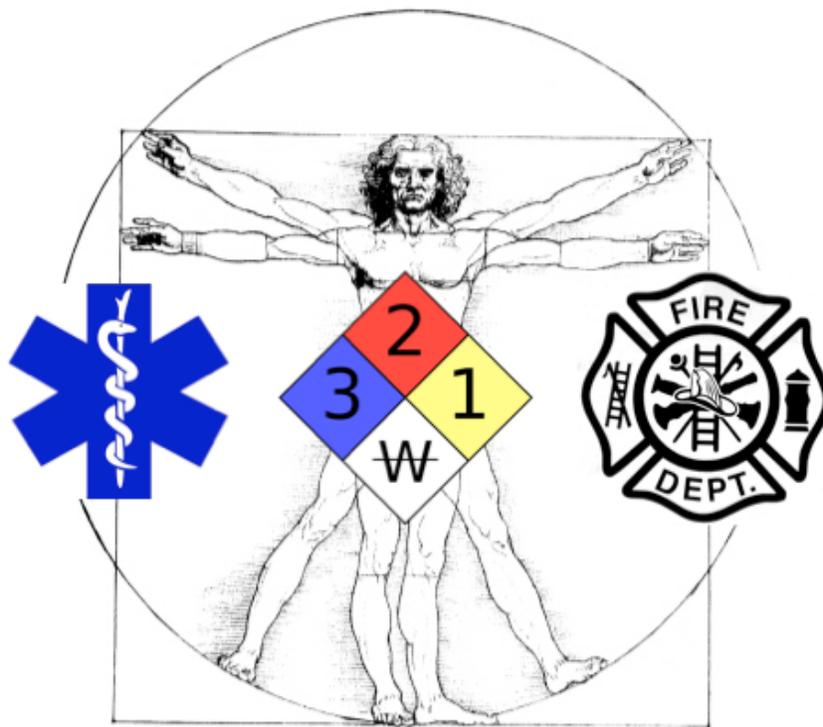

Keep your cool...

A review of Comparison of active cooling devices with passive cooling for rehabilitation of firefighters performing exercise in thermal protective clothing: a report from the Fireground Rehab Evaluation (FIRE) trial. *Original article written by:* D Hostler et al. Prehospital Emergency Care (2010) 14:300-309 AND A comparison of cooling techniques in firefighters after a live burn evolution. *Original article written by:* D Colburn et al. Prehospital Emergency Care (2011) 15:226-232.

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Introduction

Heat stress during fire suppression is unavoidable. The combination of turnout gear, exertion, and environmental heat results in the body gaining heat, causing elevated core and skin temperature and dehydration. Correcting this heat stress is one of the essential elements of fireground rehab. There are multiple active cooling devices available to the fire service. Most of these devices operate remove heat by convective or conductive cooling. However, the majority of these devices have not been thoroughly tested and there is little guidance available on how or when to use active cooling.

What the study did

Researchers at the Emergency Responder Human Performance Lab tested five active cooling devices in the laboratory and then tested the two most promising devices at the fireground to cool firefighters after a live burn training evolution. In the laboratory, participants walked on a treadmill in a heated room for 50 minutes while wearing turnout gear and SCBA. After completing the exercise, the subjects were cooled with a forearm immersion cooling chair (Kore Kooler®), a hand cooling device (AVAcORE), a fan, a cooling vest (Cool Shirt), a rapid IV infusion of cold saline, or passive cooling with turnout gear removed. After the cooling period, subjects donned their turnout gear and SCBA and returned to the heated room for another 50-minute exercise period.

At the conclusion of the lab study, the forearm immersion cooling chair and cooling vest were taken to the fire academy and compared to passive cooling in an air conditioned trailer after 20 minutes of live fire training.

What the study reported

All the active cooling strategies worked equally well when used as directed. Interestingly, *no active cooling strategy was superior to passive cooling with turnout gear removed and sitting in a room temperature environment.* None of the strategies were able to return core body temperature to baseline in a single rehab period meaning that all firefighters left the rehab sector with an elevated body temperature.

What it means for the fire service

When taken together with other studies, this study answered important questions about when active cooling should be deployed and how effective it can be. Active cooling devices are not necessary if firefighters can remove their turnout gear and be seated in a comfortable temperature and low humidity. However, other studies have shown that if rehab is conducted in hot, humid settings, only active cooling devices can blunt the rise in body temperature. If a fire department chooses to buy active cooling devices, price and ease of deployment can be the driving factor in their purchase. Keep in mind, however, that you may be able to “create” an optimal cooling environment on a hot day by using an air-conditioned vehicle such as a bus or medical trailer.

It is also important to remember that cooling and rehydration done over a 20-30 minute rehab period will not return firefighters to baseline vital signs. It is likely that rehab is only effective at making firefighters “good enough” to return to activity and to be effective and safe on the fireground. True recovery may take a number of hours after the conclusion of the incident during which time the firefighter should eat, continue to rehydrate, and avoid further heat stress.

