

# THE EFFECT OF COOLING INTERVENTIONS ON EXERCISE PERFORMANCE IN THE HEAT

## Introduction

It is widely accepted that human exercise performance is impaired in hot environments. There was a research on the effect of four different ambient conditions on cycling capacity and there was reported that exercise capacity was greatest at 11°C and progressively decreased when performed in ambient temperatures of 21°C and 31°C.

The development of hyperthermia is integral to all of the proposed theories and as a result a number of cooling strategies have been investigated in an attempt to combat the development of a high body temperature and improve sporting performance in a hot environment.

The development of hyperthermia is particularly a problem during prolonged events and so this short review will focus on the effect that cooling interventions have on exercise performance conducted in a hot environment and review the effects that the cooling intervention has on the physiological and perceptual response to the bout.

## Pre-Cooling

Pre-cooling has regularly been shown to enhance exercise endurance in hot environmental conditions during closed (i.e. performance tests) and open (i.e. capacity tests) exercise tests.

Skin temperature was significantly lowered by the pre-cooling intervention and it has been shown elsewhere that a reduction in skin temperature in the absence of a reduce core temperature can result in improved time-trial performance.

In another cooling jacket study, they investigated the effects of wearing such a device during an active warm-up on subsequent 5 km time-trial performance. They reported a significant (1.1%) improvement in performance following pre-cooling in hot conditions (32°C). The cooling jacket reduced core and skin temperature as well as heart rate and perceived levels of strain during the warm-up and early phase of the time-trial.

## Cooling during exercise

It seems prudent to suggest that if pre-cooling the body prior to exercise can enhance performance due to the manipulation of physiological parameters, sufficient cooling interventions applied during exercise may have similar, or indeed cumulative, if combined, effects.

Sources; (2011) Tyler CJ, Sunderland C Nottingham Trent University, Nottingham, United Kingdom Arngrimsson et al., 2004; Booth et al., 1997; Hessemer et al., 1984; Kay et al., 1999, Gonzalez-Alonso et al., 1999; Lee & Haymes, 1995; Webster et al., 2005), Hessemer and co-workers (1984), Arngrimsson et al. (2004), (Galloway & Maughan, 1997).