

Practical precooling improves thermal comfort during exercise and better maintains ambulatory control in heat sensitive individuals with Multiple Sclerosis

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Introduction: Exercise has been used as a rehabilitation strategy for people with Multiple Sclerosis (MS), but the associated rise in body temperature can exacerbate MS-related symptoms, precluding participation that may impact health. The aim of this study was to evaluate the efficacy of wearing practical cooling garments prior to exercise on thermal strain and comfort during exercise and whether this allowed heat sensitive individuals with MS to maintain ambulatory control post exercise.

Methods: Six heat sensitive ambulatory individuals with multiple sclerosis (4 females, 2 males, age 48.3 +/- 9.3 years, expanded disability status scale, 4.3 +/- 1.0) completed a 5 min self-paced warm up and 20 min fixed intensity cycling at 50% peak oxygen uptake on three occasions in an environmental chamber set to a typical British summer climate (24.9 +/- 0.7 degrees C, 52.0 +/- 4.8% relative humidity). Exercise was preceded by 20 min of no cooling (Control), precooling via an ice vest (Vest), or via custom-made cooling shorts (Shorts) in a randomized order. Tests of walk performance (timed up-and-go, two minute walk), visual acuity, contrast sensitivity and subjective fatigue were assessed pre cooling and post exercise.

Results: Vest and Shorts precooling reduced skin temperature prior to exercise compared with Control and this continued throughout exercise (Control, 32.3 +/- 0.5 degrees Celsius; Vest, 30.5 +/- 0.3 degrees Celsius; Shorts, 30.8 +/- 0.9 degrees Celsius, $P < 0.05$), but mean exercising core temperature was not different between conditions. Perceptually, cooling improved thermal comfort during exercise compared with Control (Control, 2.5 +/- 0.3; Vest, 1.9 +/- 0.3; Shorts, 2.0 +/- 0.4, $P < 0.05$) and reduced thermal sensation (Control, 5.8 +/- 0.4; Vest, 5.5 +/- 0.3; Shorts, 5.4 +/- 0.4, $P < 0.05$). Precooling reduced the decrement in the timed up-and-go walk performance post exercise (Control, 2.68 +/- 0.79 s; Vest, 1.97 +/- 0.92 s; Shorts, 2.12 +/- 0.33 s, $P < 0.05$), but did not ameliorate the reduction on post exercise 2 min walk distance, nor alter visual acuity, contrast sensitivity, subjective fatigue, or sweat rate.

Discussion: In the absence of reductions in core temperature, both cooling garments reduced skin temperature and perceptual markers of thermal strain during submaximal exercise under modest heat stress. Practical cooling improves thermal comfort and can maintain ambulatory control post cycling that may encourage heat sensitive individuals with MS to participate in exercise.

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