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The effects of wearing a change robe garment after cold water immersion on physiological and perceptual responses

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Introduction

Open water swimming often takes place in cold water, with this exposure potentially leading to a phenomenon known as post-immersion afterdrop, where there is a continued drop in core body temperature during the rewarming phase. Recommendations for rewarming include consuming a hot drink, relocating to a warmer environment and changing into appropriate clothing. A Dryrobe® is a commercially available clothing garment primarily designed for individuals rewarming after cold water immersion, although scientific studies have yet to test this product. The aim of the study was to investigate the effects of wearing a change robe garment after cold water immersion on physiological and perceptual responses.

Methods

Unhabituated healthy male participants (*n*=15) were recruited (only data from participants who have completed all conditions *n*=6 is presented in this abstract). A randomised repeated-measures design was used, with participants assigned to wearing a Dryrobe®, towel, or foil space blanket. Core body temperature was measured using an ingestible telemetric pill and skin temperature using wireless iButtons. Thermal sensation (1-7 Likert) and comfort (1-4 Likert) were measured using standardised ASHRAE scales. Baseline data (10-min) was recorded before participants were immersed in cold water (14ºC) for 30-min. Once participants exited the water they were then provided with either a Dryrobe®, a towel, or a foil space blanket. To simulate the conditions following open water swimming participants were then positioned in front of fans to replicate wind speed (10 mph) for 15-min. All data was collected in standardised environmental conditions (12ºC, 35% RH).

Results

Core body temperature had the smallest afterdrop between 0 and 15-min post immersion in the Dryrobe® condition (37.04 (0.43) vs. 36.97 (0.46)ºC; -0.07 (0.19)ºC) compared to the towel (-0.17 (0.27)ºC) and foil space blanket (-0.11 (0.21)ºC). Skin temperature increased the greatest between 0 and 15-min post immersion in the Dryrobe® condition (15.5 (0.6) vs. 18.7 (1.2)ºC; 3.2 (1.0)ºC) compared to the towel (1.1 (1.3)ºC) and foil space blanket (2.5 (1.2)ºC). After 15-min positioned in front of the fans post immersion, participants rated their thermal sensation score higher in the Dryrobe® (3.3 (0.8) AU) compared to the towel (1.5 (0.5 AU) and foil space blanket (1.5 (0.8) AU). Thermal comfort was also rated higher in the Dryrobe® (3.5 (0.5) AU) compared to the towel (1.8 (0.8 AU) and foil space blanket (2.2 (0.8) AU).

Conclusion

In these data, the Dryrobe® condition had the smallest afterdrop in core body temperature and the largest increase in skin temperature following cold water immersion compared to a towel and a foil space blanket. Thermal sensation and thermal comfort were also rated higher in the Dryrobe® condition. From this initial data, it appears that it would be advantageous to wear a change robe garment such as the Dryrobe® following cold water immersion, although further data is required to substantiate this.