Wrist Cooling, Exercise Performance in the Heat and Recovery

Presenter: Kelsey Denby

Advisor: Stephen Ives, PhD

Abstract:

The combination of environmental heat stress and exercise poses a significant physiological challenge and is known to impair performance. While pre-cooling has shown promise in improving performance in the heat, many of the proven methods (e.g. cold water immersion) are impractical. Recently, a novel wearable wrist cooling band (Dhama) has been developed to be used during exercise. The purpose of this study was to investigate whether the wrist cooling bands could improve exercise performance in the heat and/or lessen the physiological strain. 

**METHODS:** 13 male participants completed three 10km running trials in a heated chamber at 80°F at 60% relative humidity. The three conditions included the participants wearing two bands where: both bands were off (off/off), one band on (off/on), both bands on (on/on). Heart rate (HR, polar H7), core temperature (CoreT, HQ telemetry pill), running speed (RS), rating of perceived exertion (RPE) and thermal sensations (TS) were recorded at baseline, during the 10km time running trial, and during recovery. 

**RESULTS:** Use of the cooling bands had minimal effect at rest (iHR, 3-5 beats/min), but resulted in faster RS (-0.25 mi/hr), higher HR (-5 beats/min) and CoreT (-0.5°C) over time. Though, RPE and TS were not different. 

**CONCLUSION:** Our data demonstrate that use of the Dhama bands improves performance improved by being able to run at a faster speed, decreasing the projected 10km time (-10-30 seconds). This improvement in performance comes at a cost of increased HR and core temperature. Interestingly, sensations of effort and thermal comfort were not different given the faster speed, higher HR and CoreT. Taken together use of the cooling bands in the heat likely improves performance due to altered sensation or perception.