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## Body Sweat Mapping of Male Athletes following Acclimation to a Hot-Dry Environment

Caroline J. Smith<sup>1,2</sup> and George Havenith FACSM<sup>1</sup>

<sup>1</sup> Loughborough University, Loughborough, Leicestershire, UK

<sup>2</sup> Appalachian State University, Boone, NC 28608. USA K

Heat acclimation typically focuses on whole body sweat losses, with limited regional data available. **PURPOSE:** Our aim was to investigate changes in regional sweat rates (RSR) and distribution at multiple sites over a large surface area in young, trained male athletes following six days of exercise-heat acclimation in a hot-dry environment. **METHODS:** Six male subjects ( $25 \pm 4$  yrs) completed a 90 minute constant heat strain intermittent exercise-acclimation protocol for six consecutive days in an environmental chamber set at  $45^{\circ}\text{C}$ , 20% relative humidity,  $1 \text{ m}\cdot\text{s}^{-1}$  air velocity with a target increase in core temperature ( $T_{re}$ ) of  $1.4^{\circ}\text{C}$  above baseline. RSR were measured at two exercise intensities (I1, 55%  $\text{VO}_{2\text{max}}$ ; I2, 75%  $\text{VO}_{2\text{max}}$ ) on the torso and arms prior to and following heat acclimation using a modified absorbent technique. **RESULTS:** By design, heart rate (HR),  $T_{re}$ , and skin temperature were similar between heat acclimation days. Work rate increased from day one to six to elicit the same increase in  $T_{re}$ , but not significantly. Gross sweat loss (GSL) increased significantly from day one to six of acclimation ( $656 \pm 77$  to  $708 \pm 80 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ ;  $P < 0.001$ ). During pre and post acclimation experiments, relative workloads were similar for I1 and I2 (Pre I1  $54 \pm 3$ , I2  $57 \pm 5$  % $\text{VO}_{2\text{max}}$ ; Post I1  $73 \pm 4$ , I2  $76 \pm 7$  % $\text{VO}_{2\text{max}}$ ). GSL was significantly higher following acclimation (Pre  $449 \pm 90 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ , Post  $546 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ ;  $P < 0.01$ ). Highest RSR were observed on the central back both pre and post acclimation at I1 (pre  $854 \pm 269$  vs. post  $1178 \pm 402 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ ) and I2 (pre  $1221 \pm 351$  vs. post  $1772 \pm 396 \text{ g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ ). Absolute RSR increased significantly at 12 of the 17 regions tested at I1 and 14 at I2 ( $p < 0.05$ ). Normalized ratio data showed no significant change in distribution of RSR at I1 following acclimation. I2 ratio values significantly decreased at the lateral upper back ( $p < 0.01$ ) and increased at the anterior and posterior upper arm, and anterior lower arm ( $p < 0.05$ ) versus pre-acclimation values. **CONCLUSION:** Controlled hyperthermia exercise-heat acclimation significantly increases GSL and absolute RSR, with a preferential redistribution of sweating towards the periphery at a higher exercise intensity. Highest and lowest RSR were consistently observed on the central back versus the anterior lower torso and arms, respectively.

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