TITLE: Female skin conductance and regional differences in thermal sudomotor activity at rest and during exercise in different environments

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Introduction. Monitoring the skin conductance has been primary used within the psychological field as a method to estimate the level of tonic and phasic emotional arousal which has been shown to affect sudomotor activity. However, in the present work we explored the application of this method to the evaluation of regional variations in sudomotor activity at rest and during exercise in different environmental conditions. **Methods.** Eight healthy university female students (20.7 ± 1.5 years; 165.5 ± 6 cm; 60.4 ± 7.9 kg) volunteered to participate in the study. Each participant performed 4 trials in a climatic chamber in a balanced order. Participants entered the climatic chamber and 10 min were allowed to acclimate to environmental conditions. Then they were asked to rest on a chair (15 min) or cycling [5 min warm up (60 watts; 80 rpm) followed by 10 min exercise (60 watts; 40 rpm)] either in thermo neutral (22°C; 50% RH) or warm environmental conditions (33°C; 50% RH). The MP-35 system (Biopac, USA) was used to monitor the electrodermal activity of 3 body regions (lateral upper and lower back and lateral abdomen). Local skin temperature was monitored at 5 body sites (iButtons, Maxim, USA) and mean skin temperature was calculated using Houdas-5 points formulas. The main effect of condition and time was tested using two-way repeated measures ANOVA. Post hoc comparisons were performed to analyse individual differences. **Results**. Analysis of the data showed significant regional differences ($P<0.05$) in the skin conductance level during all the conditions. The lower back showed the highest absolute value (11.4 µS) during exercise in the warm environment, followed by the upper back (9.0 µS) and the abdomen (8.3 µS). Mean skin temperature significantly increased ($P<0.05$) during the trials in the warm environment (rest: 33.6°C; exercise: 33.7°C) compared to ones performed in thermo neutral conditions (rest: 31.4°C; exercise: 31.05°C) with no differences between rest and exercise ($P>0.05$). **Conclusion.** The significant regional differences in skin conductance observed both at rest and during exercise seem to be aligned to the results of other studies which used more traditional methods (i.e. sweat pads, ventilated capsules) to investigate regional sweat rates. The lower back has been confirmed to play a primary role in contributing to the body's cooling power through a greater sudomotor activity than other regions during elevated thermal states. This novel approach provided useful information to indicate the evaluation of the skin conductance response as an effective method to investigate regional and intra-segmental sudomotor differences.