EFFECTS OF CLOTHING AND ENVIRONMENT ON THERMOREGULATION DURING INTERMITTENT EXERCISE

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The occurrence of greater thermal strain when exercising in a warm (30°C) environment compared to a thermoneutral environment (20°C) has been well documented. There are many sport garments available on the general market which make various claims about their temperature management properties. The aim of this study, therefore, was to explore the effect of currently available polyester soccer clothing in two compositions; traditional polyester and technical 'moisture management' polyester and determine their impact on temperature regulation during soccer specific intermittent exercise.

Six healthy and exercise trained[11] males (age 20.3 ± 0.5 yrs, mass 1.82 ± 0.06 kg, VO_2max 63.0 ± 6.4 ml.kg"[1].min"[1]; means ± SD) randomly performed two 45 min soccer specific intermittent exercise bouts, with either standard polyester or new technical polyester clothing. Heart rate, rectal temperature (T_r) and skin temperature (T_{sk}) were recorded at l min intervals throughout the exercise period. Pre- and post-exercise measurements were taken of body mass to calculate sweat loss, clothing mass to calculate sweat retention, and skin blood flow (SkBF) was assessed using. Laser Doppler flowmetry. The data were analysed using a repeated measures ANOVA.

Heart rates increased similarly in both clothing treatments with mean heart rates of 162 ± 10 beats.min"[1] and 166 ± 10 beats.min"[1] for the traditional and technical clothing trials respectively ($p > 0.05$). Changes in T_r, T_{sk} (Figure 1), and SkBF also showed no significant differences ($p > 0.05$) although there was a trend for the technical fabric trial to induce lower post exercise SkBF (Figure 2). The traditional polyester ensemble retained more sweat at 203.8 ± 151.8 g following exercise compared to the technical fabric ensemble which gained only 115.5 ± 75.6 g, although this difference was not statistically significant ($p > 0.05$).

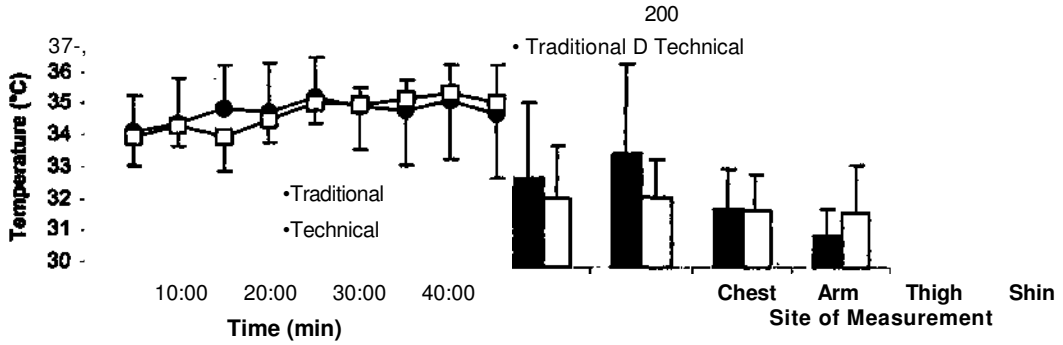

Figure 1. Mean weighted skin temperature (°C) during soccer specific intermittent exercise.

Figure 2. Changes in skin blood flow following soccer specific intermittent exercise.

The slight effects of the different fabrics are in agreement with previous findings which postulate that fabric thickness and sweat accumulation within the garments are the determinants of thermoregulatory and thermal comfort rather than the fibre type (Bakkevig and Nielsen, 1995). The fibre types of the clothing utilised in this study were the same material (100% polyester) but weave of the fibres and were different causing a somewhat dissimilar sweat accumulation and thermal characteristics. Although some differences were observed, statistical analysis revealed that the disparity between physiological parameters were not significant ($p > 0.05$). Therefore, the results of this study show that wearing a technical fabric ensemble during intermittent exercise gives no particular benefit over wearing a traditional polyester fabric ensemble.

REFERENCES

Bakkevig and Nielsen (1995). *Ergonomics* 38: 926-939