THE EFFECT OF INTERMITTENT, HIGH INTENSITY SHUTTLE RUNNING AND HOT ENVIRONMENTAL CONDITIONS ON FIELD HOCKEY SKILL PERFORMANCE

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In team sports, such as field hockey, soccer and rugby, the maintenance of physiological function is clearly important, nevertheless during such activities, the production of the required skills is at least as important in determining success. A decrease in soccer skill performance in moderate conditions has been linked to low glycogen concentrations and dehydration (McGregor et al. 1999). However, in hot conditions, hydration status has no effect upon decrement in soccer skill (Rico-Sanz et al. 1996). Thus the purpose of the present study was to examine the effect of intermittent, high intensity shuttle running in moderate (19^{o}C) and hot (30^{o}C) environmental conditions upon field hockey skill performance.

Nine, well trained, unacclimatised female hockey players participated in the study. The subjects completed up to 4 sets of 15 min of intermittent, high intensity shuttle running which involved repeated cycles of 60 m of walking, a 15 m sprint, 60 m of cruising (~85% VO_2 max) and 60 m jogging (~50% VO_2 max) (Loughborough Intermittent Shuttle Test: LIST). Prior to and following 30 and 60 min of the LIST, subjects performed a field hockey skill test. Subjects drank water ad libitum. The two trials, in moderate (19^{o}C) and hot (30^{o}C) environmental conditions, were completed one month apart to account for menstrual cycle phase. Verification of menstrual phase was completed by measurement of serum progesterone concentrations. Data were analysed using a t-test or 2-way ANOVA where appropriate and are presented as mean ± SEM.

Field hockey skill performance declined following 30 and 60 min of the LIST compared with pre-LIST (main effect time, P<0.01). This decrement in performance was compounded in the hot environment with a 6% poorer performance in the heat recorded for the 2nd skill test (main effect trial, P<0.05, hot vs moderate, 101.7 ± 3.6 s vs 95.7 ± 2.9 s, interaction trial-time, P<0.05). However, no difference was found in the decision-making element of the skill test. In the hot environment, rectal temperatures (main effect trial, P<0.01, end point hot vs moderate, 39.5 ± 0.1 ^{o}C vs 38.8 ± 0.2 ^{o}C, interaction trial-time P<0.01), perceived exertion (main effect trial, P<0.05, end set hot vs moderate 18 ± 1 vs 16 ± 1, interaction trial-time P<0.01), perceived thirst (main effect trial, P<0.01, end set hot vs moderate 8 ± 1 vs 6 ± 0) and blood glucose concentrations (main effect trial, P<0.05, end set hot vs moderate 6.05 ± 0.22 mmol.l^{-1} vs 5.63 ± 0.25 mmol.l^{-1} interaction trial-time, P<0.01) were higher. Fifteen metre sprint times were slower in the hot condition (main effect trial, P<0.01, end set hot vs moderate, 3.09 ± 0.08 s vs 2.85 ± 0.04 s, interaction trial-time P<0.01). Estimated sweat rate was greater in the hot trial (hot vs moderate 1.27 ± 0.10 l.hr^{-1} vs 1.05 ± 0.12 l.hr^{-1} P<0.05); however body mass was well maintained in both trials. No difference in serum aldosterone and cortisol, lactate, plasma volume and plasma ammonia concentrations were found between the hot and moderate conditions.

These results demonstrate that field hockey skill performance is decreased following intermittent, high intensity shuttle running and that this decrease is greater in hot environmental conditions. The exact mechanism for this decrement in performance remains to be elucidated, but is unlikely to be due to low glycogen concentration or dehydration as skill declined after only 30 min.

REFERENCES

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