FP26-488

Extreme heat conditions may increase the incidence of injuries in soccer

Binnet M.S.[1], *Kurdak S.S.*[2], *Özgünen K.T.*[2], *Maughan R.J.*[3], *Ersöz G.*[4]

[1]Ankara University Faculty of Medicine, Orthopeadic Surgery, Ankara, Turkey, [2]Cukurova University, Faculty of Medicine, Department of Physiology, Adana, Turkey, [3]Loughborough University, School of Sport and Exercise Sciences, Loughborough, United Kingdom, [4]Ankara University Faculty of Medicine, Collage of Physical Education and Sports, Ankara, Turkey

Objectives: Fatigue is expected as one of the most important factors for incidence of different type injuries during sportive events. Performing physical activities under extreme heat conditions may result premature muscle fatigue and may be accepted as one of the predisposing injury inducing variables.

Purpose: In this study we aimed to evaluate the effect of thermal stress on change in the physical performance during a soccer match played in extreme heat conditions of environmental temperature and humidity.

Methods: Non-acclimatized soccer players ($n = 22$, 20.4 ± 2.1 yrs, V'O2max = 62.6 ± 6.8 ml/min/kg) played 2 matches in different environmental conditions. Telemetric core temperature (Tc) sensors were used to measure changes in body temperature during the game. Individual covered total distance data that during the game was determined by using a separate global positioning system (GPS). A computer based analysis program was used to evaluate the GPS data. The following locomotor categories were used: standing (0 - 0.4 km/hr), walking (0.5–7.5 km/hr), jogging (7.6–14.5 km/hr), low - moderate running (14.6 - 19.5 km/hr), high speed running (19.6–25.5 km/hr) and sprinting (> 25.6 km/hr).

Results: The average ambient temperature for the June 2007 match was 34 ± 1 °C with a relative humidity of 38 ± 2 %. In the July 2007 match, ambient temperature was recorded as 36 ± 0 °C with a relative humidity of 61 ± 1 %. Peak Tc values recorded for June and July matches were 39.1 ± 0.4°C, and 39.6 ± 0.5°C. Total distance covered during June and July matches was 8.61 ± 0.58 and 8.15 ± 0.73 km respectively. When the physical activities were evaluated with regard to half times, total distance covered in the first and second halves were found as 4.38 ± 0.37 and 4.22 ± 0.30 km for June and 4.30 ± 0.49 and 3.76 ± 0.36 km for July matches. The difference between the halves of the July match was significant. It was found that the running distance covered in the second half of the July was significantly shorter than first half of July and second half of June matches (2.10 ± 0.40 and 1.87 ± 0.32 km for the first and second halves of June and 1.86 ± 0.46 and 1.33 ± 0.36 km for the first and second halves of July matches) ($p < 0.05$).

Conclusions: In soccer matches played in high environmental temperature and humidity, the physical performance of the players may decrease due to high thermal stress. The reduction of physical activity at the second half of the July game may be explained with the fatigue inducing effect of hyperthermia, which may also be interpreted as a predisposing situation for incidence of injury. With this in mind, prophylactic intervention such as proper hydration, cooling intervention and acclimatisation may be important to reduce probability of injury incidence.

This work was funded in part by FIFA/FMARC and the Turkish FA.