FLUID BALANCE AND SWEAT SODIUM CONCENTRATION IN ELITE INDOOR TEAM SPORT PLAYERS DURING TRAINING

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INTRODUCTION
Recently, studies have been devoted to investigate the fluid and electrolyte deficit that team sport players incur during training under variable outdoor conditions (1,2,3). Our purpose was to investigate the pre-training hydration status, fluid balance and sweat sodium concentration of elite team sport players training under a similar indoor environment.

METHODS
Data were collected in 12 players of 4 different sports (indoor soccer (IS), basketball (BK), handball (HB) and volleyball (VB); N=48) during a typical training session. Dry bulb temperature and training duration averaged 22.5 ± 1 °C and 87 ± 9 min, respectively. A sample of the first urine of the morning was analyzed for urine specific gravity, (Usg by refractometry; URC-Ne, Atago, Japan). During the training all players drank ad libitum. Fluid intake (FI) was measured from changes in their bottles’s weight. Sweat rate (SR) was calculated from the changes in nude body weight corrected for fluid intake. Sterile patches (Tegaderm + Pad, 3M, USA) were placed on the forearm and analyzed for sweat sodium concentration [Na+] (flame photometry; PFP7, Jenway, UK). One way ANOVA was used to detect differences between groups. Pearson’s correlation (r) was used to determine the association between variables.

RESULTS
The numbers of players with pre-training Usg > 1.020 g/mL were 11, 12, 9 and 11 for IS, BK, HB and VB, respectively. FI was 0.8 ± 0.1; 0.8 ± 0.1; 0.9 ± 0.1 and 0.9 ± 0.1 for IS, BK, HB and VB, respectively. SR was higher for IS than BH and VB (1.8 ± 0.2 vs 1.2 ± 0.1 and 1.2 ± 0.1 L/h, respectively, P<0.05). Level dehydration achieved was higher for IS and BK than VB (1.2 ± 0.3 and 1.1 ± 0.2 vs 0.4 ± 0.2 %, respectively, P<0.05) and IS than HB (1.2 ± 0.3 vs 0.5 ± 0.2 %, respectively, P<0.05). Sweat [Na+] was higher for IS than BK and HB (66 ± 6 vs 44 ± 4 and 34 ± 3 mmol/L, respectively, P<0.05 ). When data from all teams were pooled a significant correlation was found between SR and sweat [Na+] (r = 0.39; P< 0.01).

DISCUSSION
As an average 11 players (i.e., 90% of the team) started the training sessions hypohydrated (Usg>1.020 g/mL; (4)) probably as a result of an inappropriate fluid replacement after previous training sessions. Players of all teams drank similar amount of fluid despite that IS and BK players had the higher sweat rates. The lack of correlation between fluid deficit and fluid intake rates suggests that fluid intake during training in these elite players is not induced by the extent of fluid deficit. Finally, players with higher sweat rates excreted more sodium in sweat which suggests a lowered sodium reabsorption at high sweat rates.

REFERENCES

Keywords: Hypohydration, Sweat, Team Sport