Dear Editor:

I read with great interest the recent article by Anastasiou CA, Kavouras SA, Arnaoutis G, et al (and supported by the Gatorade Sport Science Institute) entitled "Sodium Replacement and Plasma Sodium Drop During Exercise in the Heat When Fluid Intake Matches Fluid Loss" (*J Athl Train.* 2009;44(2):117–123). In this letter, I propose further discussion and an alternative interpretation of their findings.

A purpose of the study was to examine the ability of several beverages (high [Na⁺], low [Na⁺], placebo, and distilled water) to maintain serum sodium concentrations when fluid supplementation matched fluid lost to sweating. The authors concluded that even small amounts of sodium (19 mmol/L) in replenished fluid were able to prevent the decrease in plasma sodium observed when sodium-free fluids were ingested during prolonged exercise. An alternative interpretation of the results is that sodium-containing beverages better attenuated the drop in serum [Na⁺] during prolonged exercise in a state of overhydration.

In citing Greenleaf and Sargent's seminal 1965 work,¹ the authors noted that "thirst perception is an insufficient means to match fluid losses during exercise." This is true, although the goal of exactly matching fluid losses during exercise is unclear. It is well established that exercising humans replace a fraction (20%-70%) of sweat losses when given ad libitum access to fluids.²⁻⁴ Recent work has demonstrated maintenance of total body water despite weight loss of 4%–5% during the prolonged exercise of an ultradistance triathlon.⁵ The correlation with body-weight loss and maintenance of physiologic [Na+] is well established.⁶ Sharwood et al⁷ demonstrated that large losses of body weight in an ultradistance triathlon correlated with neither decreased performance nor likelihood of presenting to medical stations. The recommendation to replace all weight loss with fluid volume is not supported by these studies.

The authors also noted that the findings of their study, along with those of Vrijens and Rehrer,⁸ contrast with those of several other investigators^{9–11} as to the ability of sodium-containing fluids to maintain plasma volume and [Na+]. The difference is to be found in the methods: in the latter 3 studies, ad libitum hydration was offered to participants, whereas in the former 2, participants were overhydrated by replacing sweat losses.

The authors concluded that "when sweating is excessive and the goal is to restore fluid losses during exercise, special attention should be paid to the replenishment of sodium." The data presented indicate that the goal of rehydration during exercise is not to replenish fluid losses but rather to maintain [Na+]. This is best accomplished by drinking to thirst,^{12–16} does not require sodium supplementation,^{9,17} and is usually accompanied by mild to moderate weight loss.⁶ It is my hope that critical review of hydration, as presented in this letter, will influence more runners to avoid the complications associated with overhydration. Jim Winger, MD Loyola University Stritch School of Medicine Maywood, IL

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