The Ability of the Salivary Osmolality to Accurately Assess Dehydration Status

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Abstract:

Dehydration is a common problem in athletic and occupational settings, yet accurate and convenient methods to assess hydration status are lacking. PURPOSE: To determine how salivary osmolality (Sosm) and urine specific gravity (USG) change during exercise in the heat when dehydration is progressive (to 2.5%) or when dehydration is fixed at 1%.

METHODS: Using a repeated measures design, 13 healthy, young men (age 22±1 yr; height 1.80±0.06 m; body mass 73.4±7.6 kg) completed three 30-min bouts (Bouts 1, 2, and 3) of cycling in a warm environment (environmental chamber; 30 °C, 50% relative humidity). Participants cycled at an intensity of 60-80% of age-predicted heart rate under 2 conditions: progressive dehydration and fixed dehydration in which fluid intake was restricted for Bout 1 only, followed by fluid intake sufficient to prevent further dehydration. Changes in hydration status were assessed using changes in body mass, USG, and Sosm before and after each exercise bout. Data were analyzed using a 2x3 repeated measures analysis (Condition x Time). When appropriate, Bonferroni-corrected alpha levels were employed.

RESULTS: There was a significant time effect for change in body mass, USG, and Sosm in the progressive dehydration but not fixed dehydration condition. Progressive dehydration resulted in significantly more body mass loss compared with the fixed dehydration condition (2.5±0.4% vs. 1.0±0.4% respectively, p<0.001). USG was not different between conditions at any time point (p≥0.461). Sosm differed between conditions in Bout 3 (p=0.004).

CONCLUSION: During progressive dehydration, Sosm may be a more sensitive measure of hydration status than USG.