

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 (S_{osm}) 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 S_{osm} 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 S_{osm} 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). S_{osm} differed between conditions in Bout 3 (p=0.004). **CONCLUSION:** During progressive dehydration, S_{osm} may be a more sensitive measure of hydration status than USG.