

# THE INFLUENCE OF MODERATE DEHYDRATION ON SOCCER-RELATED PERFORMANCE: A COMPARISON OF FLUID INTAKE STRATEGIES CONSISTENT WITH MATCH-PLAY OPPORTUNITIES.

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**Introduction:** Only a limited amount of information is currently available on the thermoregulatory responses of soccer players during competitive match-play<sup>1</sup> and particularly the extent to which dehydration might impact on performance related fitness. Despite obvious difficulties in directly measuring decrements in soccer match performance, few studies have utilised an experimental model incorporating outdoor match-play. This is surprising, as heat dissipation via convective cooling is impaired in *windstill* environments such as those normally encountered in indoor laboratory settings<sup>2</sup>.

**Methodology:** Eleven moderately active male soccer players (age: 24.4 ±3 years, body mass: 74.03 ±10.54 kg, height: 1.75 ±0.07 m, VO<sub>2</sub> peak: 50.91 ±3.95 ml·kg<sup>-1</sup>·min<sup>-1</sup>) volunteered to participate in the study. Each subject performed a 90-min soccer simulation protocol (45-min laboratory cycle & 45-min outdoor soccer match) on three separate occasions while undertaking differential water replacement strategies: 1) fluid-intake (FL) 2) mouth rinse only (MR) 3) no-fluid (NF). Core temperature (C<sub>T</sub>) and heart rates were measured at 10-min intervals throughout the protocol and pre- and post-test assessments were made of plasma and urine osmolalities (P<sub>osm</sub> & U<sub>osm</sub>), body composition, sweat rates, and heat storage. Post-protocol fitness in each of the experimental conditions was evaluated by tests of sport-specific fitness and mental concentration.

**Results:** The only condition-dependent difference during the 90-min protocol was a significantly elevated C<sub>T</sub> in the NF condition (P<0.05). Pre- to post-test P<sub>osm</sub> was significantly elevated in both MR and NF (P<0.01), but U<sub>osm</sub> was only significantly elevated in the post-test sample (NF) when log transformed (P<0.05). Post-test mental concentration was not different across the 3 conditions but the sport specific test performance was significantly negatively influenced in both NF and MR compared with FL (P<0.01). Post-test evaluation of RPE indicated that the NF condition was perceived to be the most challenging (P<0.05) but there were no differences in heat storage or sweat rates.

**Conclusions:** The performance of a validated soccer-specific fitness test following the 90-min soccer-simulation protocol was significantly impaired in the NF condition. It is possible that this could be attributable to either an increased thermal strain as a consequence of moderate dehydration, or negative psychological associations with an increased desire to drink. The results of this study appear to suggest a physiological mechanism is likely but further studies are required in which thirst is fully satisfied.

## References:

1. Edwards AM, Clark N. Thermoregulatory observations in soccer match-play: professional and recreational level applications using an intestinal pill system to measure core temperature. *BJ Sports Med* (2006).40: 133-138.
2. Saunders AG, Dugas JP, Tucker R, Lambert MI, Noakes TD. The effects of different air velocities on heat storage and body temperature in humans cycling in a hot, humid environment. *Acta Physiol Scand* (2005). 183(3): 241.