

Ultra-endurance cycling performance: Examining the impact of drinking to thirst vs. programmed fluid intake

Introduction: Appropriate fluid intake during exercise is important to maintain or limit the decline in aerobic exercise performance. To this effect, most sports governing bodies recommend that the goal of drinking during exercise should be to maintain body mass loss $\leq 2\%$. This idea derives from studies that compared exercise situations with or without full replacement of body water losses through sweat. However, recent studies show that drinking according to thirst sensation/*ad libitum* during exercise optimizes running and cycling performances, independent of the extent of dehydration. It is, however, unknown how this hydration strategy would impact performance beyond an exercise duration of 3h.

Purpose: Compare the effect of drinking to the dictates of thirst sensation vs. programmed fluid intake on ultra-endurance cycling performance.

Methods: 8 highly trained male cyclists/triathletes will be recruited. Using a randomized and crossover protocol, participants will undergo 2, 5h cycling (Computrainer™) bouts at 58% $\text{VO}_{2\text{max}}$ (30°C, 30% RH, fan speed matching cycling speed) followed by a 20 km time trial while, on one occasion, consuming water according to thirst sensation and, on the other, consuming water at a rate sufficient to maintain body mass loss at 1%. Measures of heart rate, rectal, body and skin temperatures, natremia, plasma osmolality, hematocrit, hemoglobin, plasma volume, urine osmolality, colour and specific gravity and perceived exertion, thirst and abdominal discomfort will be taken during the experiments.

Significance: Results will provide the scientific foundation needed to indicate whether fluid replacement based on a physiologically regulated variable, i.e., thirst, is safe and optimizes ultra-endurance cycling performance.