

## An Extended Period of Carbohydrate Mouth Rinsing Prior to Consumption Has No Additive Benefit on Cycling Performance

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### ABSTRACT

Due to limited glycogen stores, carbohydrate (CHO) consumption during exercise is effective at improving performance in endurance events lasting longer than 90 minutes in duration. Recent research has established that CHO mouth rinsing may improve performance over shorter durations, independent of actual consumption. However, research is lacking in determining if an extended period of mouth rinsing has any additive benefit in conjunction with typical CHO beverage consumption over longer competition durations, where CHO ingestion/consumption is likely warranted. **PURPOSE:** Determine the effects of CHO mouth rinsing combined with consumption compared to CHO consumption alone on cycling performance. **METHODS:** Following an initial graded exercise test to determine  $\text{VO}_2\text{max}$ , 5 male cyclists completed two cycling performance trials in a randomized, double-blind, crossover design. In order to determine any added benefit of an extended CHO mouth rinse period prior to consumption, trials consisted of two drinking conditions: 1) placebo (PLA) mouth rinse plus CHO consumption and 2) CHO mouth rinse plus CHO consumption. For the mouth rinsing, a 25 mL solution (PLA: Gatorade Zero; CHO: Gatorade) was swished for 5 seconds before spitting out. Mouth rinsing was always followed up by actual consumption of 1.5 ml/kg of CHO beverage (Gatorade). Performance trials consisted of an initial 1-hour cycling bout at a workload corresponding to 60%  $\text{VO}_2\text{max}$  on an electronically braked cycle ergometer (Wahoo Kickr). During this 1-hour segment, a 30-second sprint was performed every 10 minutes, for a total of 6 sprint efforts. The mouth rinsing/consumption protocol was performed prior to each sprint interval. Following the 1-hour bout with intermittent sprints, a 20 km time trial was performed using the simulation mode setting on the cycle ergometer. The same mouth rinsing/consumption protocol was performed every 4 km during the time trial. A two-way (condition x time) repeated measures ANOVA was used to determine effects on sprint power output and rating of perceived exertion (RPE) during the 1-hour segment as well as 20 km time trial performance. **RESULTS:** There were no main effects for condition or interactions for any of the performance variables measured. Averages values  $\pm$  SD for the 6 sprint segments during the 1-hour bout were as follows: sprint power (watts, CHO:  $425 \pm 80$ , PLA:  $437 \pm 48$ ), heart rate (bpm, CHO:  $157 \pm 12$ , PLA:  $157 \pm 8$ ), RPE (CHO:  $16.7 \pm 3.3$ , PLA:  $17.3 \pm 2.4$ ). Further, 20 km time trial performance did not differ between conditions (CHO:  $43.1 \pm 3.8$  min, PLA:  $42.8 \pm 3.6$  min). **CONCLUSION:** In this limited sample, it does not appear that an extended CHO mouth rinsing period has any additive benefit to typical CHO consumption. This would suggest that any receptors thought to be stimulated through mouth rinsing are already stimulated adequately with normal CHO beverage consumption.