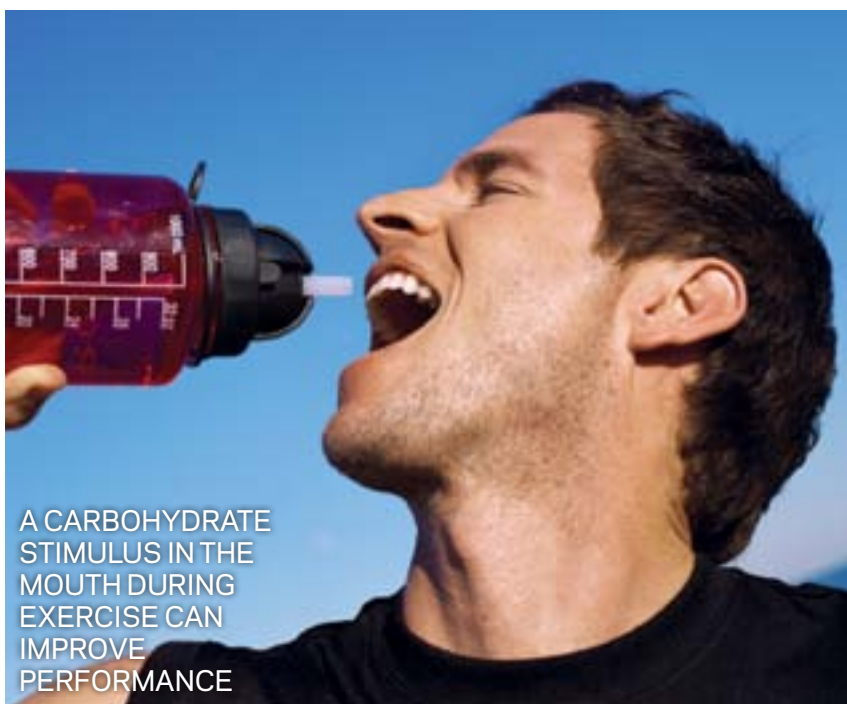


PERFORMANCE NUTRITION

DECIPHERING THE LATEST SCIENTIFIC RESEARCH TO HELP YOU GET THE **MOST FROM YOUR TRAINING, DIET AND SUPPLEMENTATION**

BY JAMES COLLINS



A CARBOHYDRATE STIMULUS IN THE MOUTH DURING EXERCISE CAN IMPROVE PERFORMANCE

RINSE YOUR MOUTH WITH CARBS TO IMPROVE PERFORMANCE

Studies have shown that rinsing your mouth with a carbohydrate drink during exercise, without actually drinking the fluid, can improve performance.

How this actually happens has not been fully determined but it appears to be something to do with the brain receiving messages that modify behaviour to exercise.

A recent study in the *Personality and Social Psychology Bulletin* shed some light on this phenomenon. The study took a novel approach and focused

specifically on the importance of self-control.

Self-control can be defined as the extent to which people overcome a dominant behavioural response in favour of some alternative course of action. For example, choosing to complete a sixth rep of a set of squats when the physiological cues from the body are saying 'no'.

Mouth-rinsing with a carbohydrate solution was shown in the study to improve performance in a variety of tasks used to measure self-control. This suggests carbohydrate mouth-rinsing has a neural (i.e. related to the nervous

system), rather than a metabolic mechanism of action in the body.

MAIN FINDINGS

In five separate experiments, participants that received a carbohydrate mouth rinse performed significantly better on a self-control task than the participants that rinsed with a placebo, after engaging in an initial depleting task.

SIGNIFICANT METHODOLOGY

Each of the five experiments followed a similar format. Participants first undertook an initial task that depleted their self-control resources, such as reading a boring passage of text in an expressive fashion or attempting to complete an unsolvable figure-tracing task. On completion of this task, participants mouth-rinsed (without swallowing) an 18% carbohydrate or a placebo (non-caloric artificial sweetener) solution. They were then asked to complete a self-control task, such as a handgrip task or a Stroop (reaction time) test. It should be noted that the 18% carbohydrate solution used in the study was considerably more concentrated than most sports drinks, which are usually in the region of 5–8%.

TAKE-HOME MESSAGE

This study broadens our understanding of the mechanism by which a carbohydrate stimulus in the mouth during exercise can improve performance.

It appears that the stimulus increases neural drive, which enhances the activation of the reward centres in the brain that underpin response. This may consequently alter behavioural responses, such as increasing self-control and levels of motivation.

Evidence suggests that the ergogenic (performance-enhancing) effects of carbohydrate mouth-rinsing are negated when exercise is performed after eating a meal. Therefore, for the many people that consume a pre-race meal there may not be an immediate benefit to mouth-rinsing with a carbohydrate solution. They will benefit more from drinking, rather than just mouth-rinsing, a carbohydrate drink during exercise as it

will help to replace lost fluid and provide electrolytes. However, mouth-rinsing could prove a novel strategy for performers involved in weight category or aesthetic sports where power-to-mass or aesthetic appearance is key (e.g. gymnastics, diving, bodybuilding).

REFERENCE

■ Hagger MS, Chatzisarantis NLD (2012) **The Sweet Taste of Success: The Presence of Glucose in the Oral Cavity Moderates the Depletion of Self-Control Resources.** *Personality and Social Psychology Bulletin*. [Epub ahead of print]

CONSUME CARBOHYDRATES WHEN CYCLING IN A TRIATHLON TO IMPROVE YOUR RUN

A plethora of research has focused on the effects on endurance athletes when taking carbohydrate supplements. However, only one study has focused specifically on triathlon, the multi-disciplinary sport that involves swimming, cycling and running.

A team of exercise scientists at the University of Bath found that when triathletes consumed a high-dose carbohydrate solution during the cycle leg of the triathlon, it improved their performance in the subsequent run.

It is difficult for competitors to refuel during the early stages of a triathlon because they are swimming. Therefore nutritional strategies should focus on the cycle and run stages.

MAIN FINDINGS

Triathletes that consumed a carbohydrate drink when cycling completed their runs 4% faster than those that took a placebo solution. Average times to complete the run were 38 minutes 43 seconds and 40 minutes 22 seconds in the carbohydrate and placebo trials, respectively. Perceived stomach upset did not differ between the carbohydrate and placebo trials.

SIGNIFICANT METHODOLOGY

Ten amateur triathletes (6 males and 4 females) participated in the study, which comprised three visits to the University of Bath. For the first visit, participants completed a 1500 metre time-trial swim and incremental test on



THE CYCLE STAGE IS AN IDEAL TIME TO TAKE ON FUEL AND FLUIDS

the cycle ergometer to determine VO_2 peak. The following 2 visits were for the experimental trials, which involved a fixed intensity 1500 metre swim (in a 50 metre swimming pool) and approx. 40 km cycle (on a cycle ergometer), before completing a 10 km running time trial (on a flat, asphalt surface within the university campus). Participants consumed approximately 200 ml of either a carbohydrate (14 % maltodextrin-fructose mix) or placebo (sugar-free) solution at four time points during the cycle.

TAKE-HOME MESSAGE

The study provides convincing evidence of the performance benefits of carbohydrate intake during the cycling leg of a triathlon. The cycle section is an ideal time to take on fuel and fluids during the race and sports drinks, carbohydrate-electrolyte gels and foods provide a rapidly digestible source of carbohydrate.

It is vital that triathletes experiment with different fuelling strategies during training sessions to ensure they do not experience any adverse effects such as stomach discomfort during competition. Studies have shown that performers can utilise 60-90 grams of exogenous

(from outside of the body) carbohydrate per hour during exercise, however this response is highly individual. Although triathletes should initially avoid consuming more than this amount, there is growing evidence that with regular carbohydrate supplementation during exercise the gastrointestinal system can be trained to utilise carbohydrate at a faster rate.

It should be noted that whilst carbohydrate intake can improve race performance, there are periods of training (where adaptation, not performance, is the key focus) in which athletes may wish to consider restricting carbohydrate intake around the time of exercise in order to promote aerobic adaptations. **M&F**

REFERENCE

■ McGawley K, Shannon O, Betts J (2012) **Ingesting a high-dose carbohydrate solution during the cycle section of a simulated olympic distance triathlon improves subsequent run performance.** *Applied Physiology, Nutrition, and Metabolism*, 37 (4). pp. 664-671.

Performance Nutrition is a unique London-based consultancy, providing comprehensive support to elite and recreational athletes. Director, James Collins, is a leading Sport and Exercise Nutritionist, working with Great Britain Elite Sports in preparation for the Olympic Games and as Head Nutritionist for Arsenal FC. For further information visit www.thepernutritionist.com