Effects of ingesting a sports drink during exercise and recovery on subsequent endurance capacity

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Introduction

Background

Carbohydrate-electrolyte sports drinks are specially crafted with **carbohydrates (CHO), fluids and electrolytes** (Coyle, 2004).

These sports drinks are **effective for enhancing or sustaining endurance performance and recovery,** compared with water and placebo solutions (Coombes & Hamilton, 2000).

However, the effects of sports drink ingestion on a **second bout of exercise, post-recovery**, is not well investigated. Results for such a study would be useful for **elite endurance athletes** who need to recovery optimally from exhaustive training, to undertake a second bout of training on the same day.

Aims

We investigated the effects of ingesting a commercial sports drink **during exercise and recovery,** and its impact on the performance of a second bout of maximum exercise.

This study assumed that an athlete who recovers faster will perform better in the second round of physical activity, which would improve capabilities during competition

Hypothesis

Consumption of the sports drink would be **better** than ingesting water or a placebo drink in replacing CHO and fluid during recovery will have positive effects on performance in a subsequent bout of exhaustive exercise.

Methods

- 12 males of similar physical characteristics were recruited
  - Mean age 24.3 ± 1.6 years
  - Physically active: exercise ⩾5 times/week
- They performed the same experiments in random order on 3 separate occasions, drinking either water, placebo, or commercially available sports drink
- Results taken: blood sample, rating of perceived exertion and thermal perception, core temperature, HR, fluid questionnaire (for taste of drink)

Phase 1: 75 min cycling at 65% VO_2 peak
Phase 2: 5h recovery
Phase 3: Endurance capacity at 65% VO_2 peak

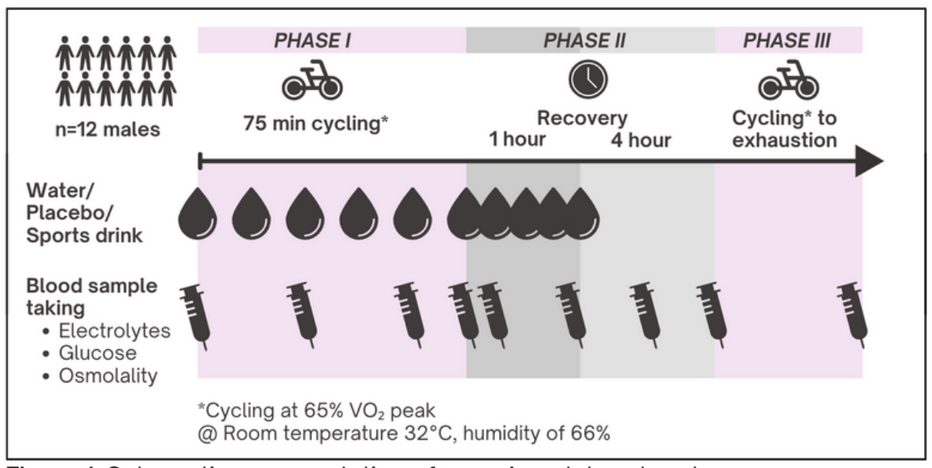

Figure 1. Schematic representation of experimental protocol.

Results & Discussion

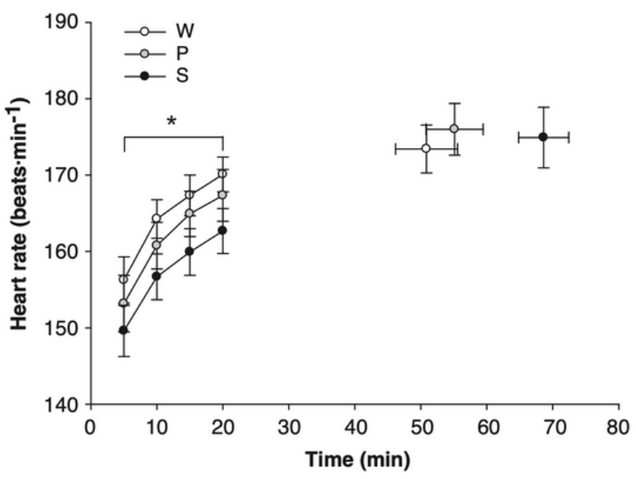

Figure 2. Heart rate during the ride to exhaustion. Mean values±standard errors are shown. ***Sports drink significantly different from water (P<0.017).**

- **Mean heart rates** were lower with the ingestion of the sports drink than with water during the ride to exhaustion (P=0.011).
- This is in line with the observed enhanced capacity with the sports drink.

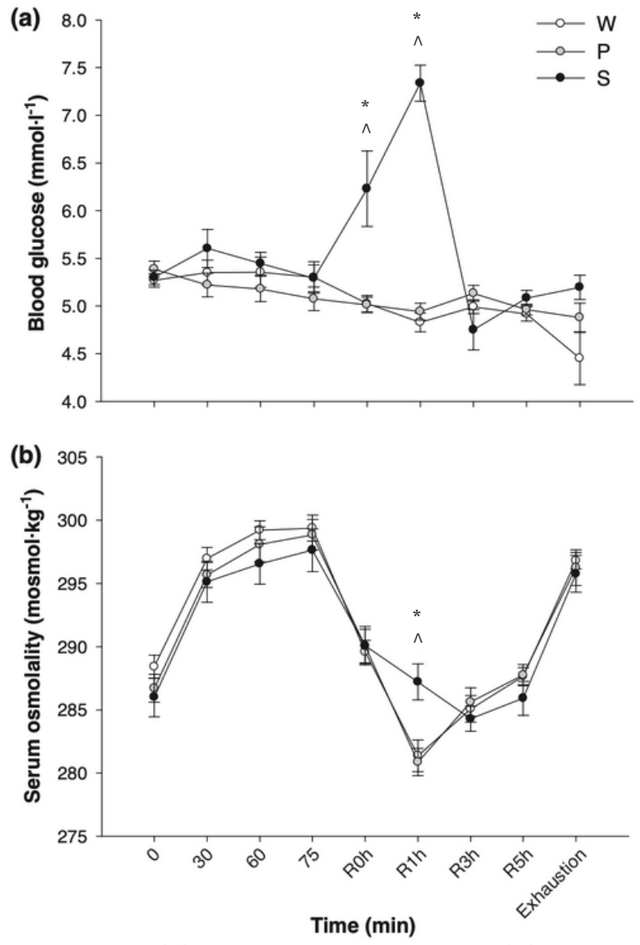

Figure 3. (a) Blood glucose and (b) serum osmolality during the experimental trial. Mean values±standard errors are shown. ***Sports drink significantly different from water (P<0.017). ^Sports drink significantly different from placebo (P<0.017).**

- **Blood glucose concentrations** at 0 h (P<0.017) and 1 h (P<0.001) of recovery were higher with the sports drink than with water and placebo. This is likely to promote glycogen synthesis during recovery and improve endurance.
- **Serum osmolality** at 1 h of recovery was higher with the sports drink than water (P=0.004) and placebo (P=0.016), thereby promoting fluid retention.

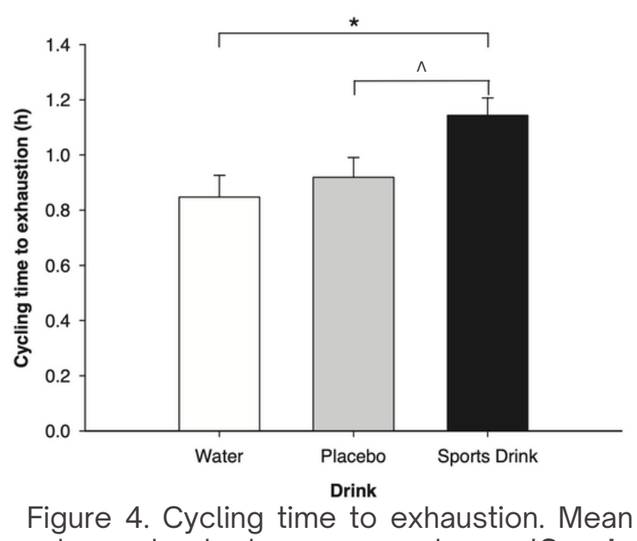

Figure 4. Cycling time to exhaustion. Mean values±standard errors are shown. ***Sports drink significantly longer than water (P<0.017). ^Sports drink significantly longer than placebo (P<0.017).**

- When ingesting the sports drink, the participants cycled for 43±34% (17.7±12.1 min; P<0.001) longer than in the water trial, and 30±34% (13.5±15.7 min; P=0.013) longer than in the placebo trial.
- **Endurance capacity** was greater with ingestion of the sports drink than water and placebo.

Conclusion

Ingestion of carbohydrate-electrolyte solutions replaces fluid, CHO and promotes exercise performance more effectively than water and placebo after exercise

For athletes participating in repeated exercise bouts within a single day, ingesting sports drink during exercise and recovery will improve subsequent endurance capacity compared with water and placebo.

References

1. Coombes, J. S., & Hamilton, K. L. (2000). The effectiveness of commercially available sports drinks. Sports Medicine, 29(3), 181–209. https://doi.org/10.2165/00007256-200029030-00004
2. Coyle, E. F. (2004). Fluid and fuel intake during exercise. Journal of Sports Sciences, 22(1), 39–55. https://doi.org/10.1080/02640410310001405 45