



Original article

Effect of a carbohydrate drink on soccer skill performance following a sport-specific training program

John O'Reilly, Stephen H. Wong*

Department of Sports Science and Physical Education, The Chinese University of Hong Kong, Shatin, Hong Kong

Received 7 November 2013; accepted 8 November 2013

Available online 15 December 2013

Abstract

Monitoring personal hydration status as well as examining the contents of sports beverages is crucial to improve physical performance in soccer players. This study examined the effects of 60 minutes of soccer-specific training on skill performance, hydration status, and core temperature (T_c) of soccer players after ingesting either a carbohydrate-containing (CHO) or a carbohydrate-free (CHO-F) drink. This study recruited seven healthy male soccer players (age: 23 ± 2.9 years, height: 1.7 ± 0.04 m, mass: 62.7 ± 6.7 kg), each of whom completed a CHO and a CHO-F trial in a randomized crossover design. The participants underwent skill tests [Loughborough Soccer Passing Test (LSPT)] prior to and after 60 minutes of training in a hot and humid environment (30 °C, 85% relative humidity). They consumed 2 mL of fluid per/kg body mass every 15 minutes during exercise. Blood glucose, blood lactate, and T_c were monitored throughout the exercise session. Improvement was observed in movement time ($p = 0.034$) and overall LSPT performance ($p = 0.031$) postexercise in those consuming CHO drinks compared with those consuming CHO-F drinks. No differences were observed in T_c or absolute and relative body mass loss between the trial groups ($p > 0.05$). Urine output was greater in the CHO trial group (CHO: 0.086 ± 0.051 L; CHO-F: 0.030 ± 0.028 L; $p = 0.043$). Compared with the consumption of a CHO-F drink, that of a CHO drink during a 60-minute soccer-specific exercise session in a hot and humid climate can improve postexercise skill performance. Additionally, T_c can be regulated efficiently by commencing training in a state of euhydration and by regular ingestion of fluids throughout the exercise period.

Copyright © 2013, The Society of Chinese Scholars on Exercise Physiology and Fitness. Published by Elsevier (Singapore) Pte Ltd. All rights reserved.

Keywords: Dehydration; Football; Thermoregulation

Introduction

The game of soccer is associated with frequent intermittent high-intensity exercise, and success in soccer depends on various factors related to match play, including tactical, technical, mental, and physiological characteristics of players.¹ Key elements of the game include the players' ability to perform repeated high-intensity work while maintaining efficient execution of skills when in possession of the ball.² As soccer is a highly competitive elite-level sport, skill level plays an important role in the evaluation of players and the team. As

a result, many recent studies have focused on the measurement of skills that are related to the performance of a soccer player.³ However, skill performance can be impaired following bouts of brief, high-intensity exercise.⁴

The scientific literature has highlighted that the capacity to exercise in the heat is limited by a critical core temperature (T_c).^{5–7} In addition, heat- and exercise-induced dehydration have been shown to impair the cardiac and thermoregulatory responses to exercise, and the degree of impairment depends on the percentage of dehydration.⁸ Previously, a loss of ~2% body mass (BM) has been shown to reduce the skill performance of a semi-professional soccer player by 5%.⁹ An investigation has also highlighted that a lack of adequate fluid intake during exercise can precipitate a premature increase in heart rate (HR) and T_c.¹⁰ Furthermore, dehydration has also

* Corresponding author. G08 Kwok Sports Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong.

E-mail address: hswong@cuhk.edu.hk (S.H. Wong).