

Acute Effects of Carbohydrate Supplementation on Intermittent Sports Performance

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Abstract

Intermittent sports (e.g., team sports) are diverse in their rules and regulations but similar in the pattern of play; that is, intermittent high-intensity movements and the execution of sport-specific skills over a prolonged period of time (~1-2 h). Performance during intermittent sports is dependent upon a combination of anaerobic and aerobic energy systems, both of which rely on muscle glycogen and/or blood glucose as an important substrate for energy production. The aims of this paper are to review: (1) potential biological mechanisms by which carbohydrate may impact intermittent sport performance; (2) the acute effects of carbohydrate ingestion on intermittent sport performance, including intermittent high-intensity exercise capacity, sprinting, jumping, skill, change of direction speed, and cognition; and (3) what recommendations can be derived for carbohydrate intake before/during exercise in intermittent sports based on the available evidence. The most researched intermittent sport is soccer but some sport-specific studies have also been conducted in other sports (e.g., rugby, field hockey, basketball, American football, and racquet sports). Carbohydrate ingestion before/during exercise has been shown in most studies to enhance intermittent high-intensity exercise capacity. However, studies have shown mixed results with regards to the acute effects of carbohydrate intake on sprinting, jumping, skill, change of direction speed, and cognition. In most of these studies the amount of carbohydrate consumed was ~30-60 g/h in the form of a 6%-7% carbohydrate solution comprised of sucrose, glucose, and/or maltodextrin. The magnitude of the impact that carbohydrate ingestion has on intermittent sport performance is likely dependent on the carbohydrate status of the individual; that is, carbohydrate ingestion has the greatest impact on performance under circumstances eliciting fatigue and/or hypoglycemia. Accordingly, carbohydrate ingestion before and during a game seems to have the greatest impact on intermittent sports performance towards the end of the game.

KEYWORDS:

glucose; glycogen; intermittent exercise capacity; skill; sprinting; team sports

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