The effects of carbohydrate loading 48 hours prior to a simulated squash match.

Aaron Raman

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Massey University, Palmerston North, New Zealand

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Abstract

Squash is a high-intensity, intermittent racket sport that is played by over 15 million people worldwide (Eime & Finch, 2002). Unlike other racquet sports such as tennis, squash has had limited attention in the area of sports nutrition and exercise performance. Furthermore, the effect of carbohydrate ingestion in the days (48 hours) leading up to a squash match has not been explored. Eight squash players who were graded at a Squash New Zealand grade of C1 or above were recruited. Following a familiarisation subjects completed two further trials which consisted of a bout of exhaustive exercise prior to completing a simulated squash match, following a controlled diet for 48 hours in between initial exhaustive exercise bout and match simulation. The match simulation was aimed to mimic the expected metabolic changes during a five-set match lasting about an hour to incorporate the endurance factor of exercise. Performance was measured by the time required to complete each set, which was designed to last ~12 minutes followed by a rest period of ~120 seconds in order to collect measurements. The interventions were assigned in a randomised, single-blind, cross-over design. The interventions consisted of a standardised diet with additional energy intake via the form of a 'sports drink'. The high-carbohydrate ($11.1 g \cdot kg^{-1}$) diet was primarily delivered in the form of a carbohydrate-containing solution containing maltodextrin; whilst the calorie-matched low-carbohydrate ($2.1 g \cdot kg^{-1}$) drink was made from a combination of milk powder, protein powder and oil. Oxygen uptake, respiratory exchange ratio (RER), fat and carbohydrate oxidation, and heart rate were continuously collected throughout the trial. Blood glucose and lactate samples were obtained before and after each squash set. Rating of Perceived Exertion (RPE) was also recorded after each set. There was an overall main effect of the intervention as seen from RER ($p = 0.016$). The difference in RER was further supported by a significant difference seen in fat ($p = 0.011$) and carbohydrate ($p = 0.013$) oxidation. Though an interaction of performance time and the intervention was progressing towards significance ($p = 0.076$), it narrowly missed the α-value of 0.05 to achieve significance. A significant main effect of the trial was not present in both blood glucose and lactate ($p > 0.05$). However, blood glucose and lactate had a significant effect of time of $p = 0.005$ and $p < 0.001$, respectively. These results point towards a beneficial effect of carbohydrate ingestion on squash performance. However, further research will be required to support the findings of this study.