

Proceeding Paper

Effect of 6% Maltodextrin Intake on Capillary Lactate Concentration in Soccer Players [†]

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Abstract: Recent literature suggests that ergogenic substances may play a beneficial role in intermittent exercise. Maltodextrin supplementation has been investigated in soccer players, but few studies have been reported. The aim of this study was to evaluate the effect of 6% maltodextrin supplementation on capillary lactate in soccer players. The study was carried out during soccer training, which was characterised by intense activity (90 min). Participants ($n = 24$) were randomly allocated in control (water) and intervention (6% maltodextrin solution) groups. Capillary lactate levels were evaluated at pre-exercise (0 min— t_0), exercise (45 min— t_1), and post-exercise (90 min— t_2) moments. At t_1 , the mean capillary lactate concentration value was significantly higher in players not supplemented with 6% maltodextrin (5.47 mmol/L) than in supplemented players (4.79 mmol/L).

Keywords: maltodextrin; carbohydrates; capillary lactate; soccer players



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1. Introduction

Football is a sport with intermittent exercises of varying intensity. About 88% of the time of a football match involves aerobic activities, and 12% involves high-intensity anaerobic activities. Performance during intermittent sport is dependent upon the anaerobic and aerobic energy combination. High-intensity exercise implies a greater intramuscular accumulation of lactate, which may lead to extreme fatigue. The accumulation of lactate is one of the most important causes of skeletal muscle fatigue, i.e., a decline in muscle strength, which consequently leads to a decrease in exercise performance. Carbohydrates have been the most commonly used substrate as an ergogenic resource before sport, as it has been found that their intake in intermittent sport can have a positive impact on performance [1–3]. The aim of the present study was to evaluate the effect of 6% maltodextrin supplementation on capillary lactate concentration in soccer players.

2. Materials and Methods

Following Cooperativa Egas Moniz Ethical Committee approval, 24 male professional soccer players with ages between 18 and 35 years were recruited from three football clubs. After the collection of written informed consent, participants were randomly allocated in a control group (ingestion of 250 mL of water; $n = 12$) or an intervention group (ingestion of 250 mL of 6% maltodextrin solution; $n = 12$). The study was conducted during a regular soccer field practice (90 min). The intervention and control groups ingested, respectively, maltodextrin or water immediately before the soccer practice. Capillary lactate was evaluated in both groups at pre-exercise (t_0), during exercise (45 min; t_1), and post-exercise (90 min; t_2) moments. At baseline, anthropometric and 24-h dietary recall

data were taken for both groups. A mixed type, repeated measures ANOVA was used for statistical analysis at the 5% level of significance.

3. Results and Discussion

Results revealed that there was interaction between the independent and repeated measure factors ($F_{(1,31)} = 38.124$; $p < 0.001$), which means that it was possible to infer differences in capillary lactate at different moments. At the t1 moment, the mean capillary lactate concentration value was significantly higher in players not supplemented with 6% maltodextrin (5.47 mmol/L) than in supplemented players (4.79 mmol/L). However, at the t2 moment, no significant differences were found between non-supplemented players (2.13 mmol/L) and maltodextrin-supplemented players (2.67 mmol/L) (Figure 1).

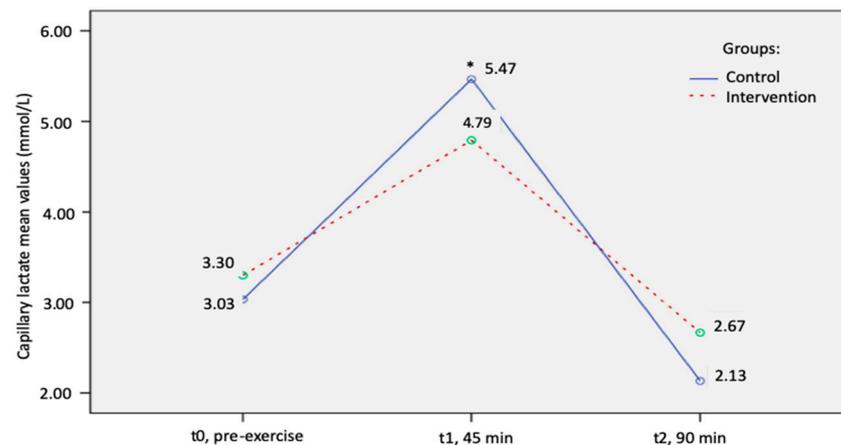


Figure 1. Mean soccer player capillary lactate values (mmol/L) in control (blue line) and intervention (red line) groups for the 3 studied moments: t₀, t₁ and t₂; (*)—the difference of mean capillary lactate concentration values between groups with statistical significance.

The two groups were considered homogeneous because there were no significant differences ($p < 0.05$) for the mean values of the anthropometric parameters of food intake (on the day before the intervention) and capillary lactate levels at t₀. Data of the present study showed that 6% maltodextrin supplementation decreased the mean capillary lactate values in a short time, which could mean an improvement of performance in the middle of a soccer game. These results were in agreement with those of previous studies in which maltodextrin did not reveal significant differences at a post-exercise moment, suggesting that maltodextrin did not increase glycogen content post-resistance exercise [4]. From this study, it can be concluded that the ingestion of 6% maltodextrin can play a beneficial role by decreasing the mean values of capillary lactate concentration in soccer players in the middle of a soccer game. These results may represent an important application in the performance of professional soccer players, since they are subject to intense training that is associated with fatigue. In this context, pre-exercise supplementation with maltodextrin may decrease lactate accumulation and consequently reduce fatigue.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethical Committee of the Cooperativa de Ensino Egas Moniz (protocol code 619 and date of approval 30 May 2018).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

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Conflicts of Interest: The authors declare no conflict of interest.

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