Ergogenic effects of beetroot juice supplementation during severe-intensity exercise in obese adolescents.

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Previous studies showed a higher O_2 cost of exercise, and therefore, a reduced exercise tolerance in patients with obesity during constant work rate (CWR) exercise compared with healthy subjects. Among the ergogenic effects of dietary nitrate (NO_3^-) supplementation in sedentary healthy subjects, a reduced O_2 cost and enhanced exercise tolerance have often been demonstrated. The aim of this study was to evaluate the effects of beetroot juice (BR) supplementation, rich in NO_3^-, on physiological variables associated with exercise tolerance in adolescents with obesity. In a double-blind, randomized crossover study, 10 adolescents with obesity (8 girls, 2 boys; age = 16 ± 1 yr; body mass index = 35.2 ± 5.0 kg/m^2) were tested after 6 days of supplementation with BR (5 mmol NO_3^- per day) or placebo (PLA). Following each supplementation period, patients carried out two repetitions of 6-min moderate-intensity CWR exercise and one severe-intensity CWR exercise until exhaustion. Plasma NO_3^- concentration was significantly higher in BR versus PLA (108 ± 37 vs. 15 ± 5 μM, $P < 0.0001$). The O_2 cost of moderate-intensity exercise was not different in BR versus PLA (13.3 ± 1.7 vs. 12.9 ± 1.1 ml·min^{-1}·W^{-1}, $P = 0.517$). During severe-intensity exercise, signs of a reduced amplitude of the O2 uptake slow component were observed in BR, in association with a significantly longer time to exhaustion (561 ± 198 s in BR vs. 457 ± 101 s in PLA, $P = 0.0143$). In obese adolescents, short-term dietary NO_3^- supplementation is effective in improving exercise tolerance during severe-intensity exercise. This may prove to be useful in counteracting early fatigue and reduced physical activity in this at-risk population.