Efficacy of Carbohydrate Feeding on Occupational Injury Rate and Productivity in Reforestation Workers in Energy Deficit

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Introduction

Much evidence indicates an ergogenic effect from carbohydrate (CHO) intake during prolonged exercise; however, this effect has not been examined in the workplace for the many occupations where workers are in energy deficit. We hypothesized that strategies for improving cognitive and motor performance can help reduce occupational injury rates. PURPOSE: To investigate the effect of CHO feeding on productivity and injury rates of manual tree planters. METHODS: Forty-three age, sex and experience matched planters were randomly assigned to either placebo (EB) or CHO (ECHO) groups. Treatments were provided as a base-diet (3859 ± 468 kcal) plus electrolyte beverages (3 mEq/L potassium, 18 mM/L sodium) identical except for the addition of 6% CHO. Work performance and fatigue were evaluated by hand grip strength, hand agility, and trees planted in addition to physiological and biological responses to work tasks. RESULTS: Planters worked a mean of 5.9±2.9 hr at between 40% - 70% VO2max. carrying a mean of 26.3±5.3% body mass. No differences were observed in hand grip strength between the two groups following planting. However, hand agility scores indicated facilitation only in the ECHO group. In addition ECHO group displayed less slowing of planting over 23 days of planting and smaller biochemical changes indicative of high energy deficit. We hypothesized that strategies for improving cognitive and motor function may help reduce the high injury rate observed in this group. In addition to physiological and biological responses to work tasks, injury rate was significantly lower in the ECHO group with a mean of 0.005 injuries per 104 tree planting days vs. 0.015 injuries per 104 tree planting days in the EB group. The physiological significance of reducing the energy deficit was evident in the lower fatigue observed in the CHO fed group. A hand grip test that included components of speed and coordination showed facilitation only in the CHO fed group. Furthermore, planters in this group experienced significantly fewer injuries and illnesses compared to the EB group as well as lower cortisol and IL-6 levels. CONCLUSION: This study suggests that CHO feeding can help reduce injury/injury events and enhance productivity in occupational groups in caloric deficit.

Abstract

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References