Oxidation rate of exogenous carbohydrate during exercise is higher in boys than in men

Brian W. Timmons, Oded Bar-Or, and Michael C. Riddell

Published: J Appl Physiol 94: 278-284

To determine whether the relative utilization of exogenous carbohydrate (CHO_{exo}) differs between children and adults, substrate utilization during 60 min of cycling at 70% peak O_2 uptake was studied in 12 pre and early puberty boys (9.8 ± 0.1 yr) and 10 men (22.1 ± 0.5 yr) on two occasions. Subjects consumed either a placebo or a C-enriched 6% CHO_{exo} beverage (total volume per trial: 24 ml/kg). Substrate utilization was calculated for the final 30 min of exercise. During both trials, total fat oxidation was higher (5.4 ± 0.5 vs. 3.0 ± 0.4 mg·kg^{-1}·min^{-1}, P < 0.001) and total CHO oxidation lower (27.4 ± 1.5 vs. 34.8 ± 1.2 mg·kg^{-1}·min^{-1}, P < 0.001) in boys than in men, respectively. During the CHO_{exo} trial, CHO_{exo} oxidation was higher (P < 0.001) in boys (8.8 ± 0.5 mg·kg^{-1}·min^{-1}) than in men (6.2 ± 0.5 mg·kg^{-1}·min^{-1}) and provided a greater (P < 0.001) relative proportion of total energy in boys (21.8 ± 1.4%) than in men (14.6 ± 0.9%). These results suggest that, although endogenous CHO utilization during exercise is lower, the relative oxidation of ingested CHO is considerably higher in boys than in men. The greater reliance on CHO_{exo} in boys may be important in preserving endogenous fuels and may be related to puberty status.