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Dietary intake of adolescent rowers - analysis of energy intake

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Adequate energy intake (EI) is essential for adolescent athletes to support health, performance, and growth[(1)]. Rowing is a physically demanding sport where intense training begins in adolescence. Research is needed to assess whether current EI is sufficient to support healthy physiological functions and training in adolescent rowers. The aim of this study was to evaluate the energy status (energy availability (EA) or energy balance (EB)) including EI and exercise energy expenditure (EEE) of adolescent rowers in New Zealand. A total of 35 rowers (23 females, 16.8yrs ± 1.9yrs; 12 males, 17.3yrs ± 1.6yrs) who had been rowing for at least one season participated. A bioimpedance analyser measured body composition in 11 participants (8 females, weight 63.0±7.0kg, fat free mass (FFM) 50.8 ± 6.5kg; 3 males, weight 78.5 ± 15.9kg, FFM 70.7 ± 12.2kg) enabling calculation of EA. Due to COVID-19 restrictions, the remaining 24 participants (15 females, 9 males) provided estimated body weight (74.7 ± 9.2kg) and EB was then used to evaluate energy status. All participants completed four days of food and training diaries, two 'recovery' and two 'hard' training days. EI was determined in FoodWorks10 software using the New Zealand Food Composition Database. For training, metabolic equivalent of tasks (MET)[(2)] were assigned using bodyweight, heart rate, and rating of perceived effort to estimate EEE. Paired sample t-tests or Wilcoxon Signed Rank test (non-parametric data) was used to determine differences between EI, EEE, EA, and EB on the high and low training days for each gender. Significance was set at $p < 0.05$. The average EI for females on hard and recovery days was 10837 ± 3304kJ and 10461 ± 2882kJ respectively, and for males was 15293 ± 3971kJ and 13319 ± 4943kJ, respectively. No significant differences were found between EI on hard vs. recovery days in both genders. Significant differences between average EEE on hard vs. recovery days were found in both genders (females, hard day 4609 ± 2446kJ, recovery day 3146 ± 1905kJ, $p<0.001$; males, hard day 6589 ± 1575kJ, recovery day 3326 ± 2890kJ, $p = 0.001$). EA on hard and recovery training days was classified as suboptimal at 142 ± 80kJ/FFMkg/day and 167 ± 79kJ/FFMkg/day respectively with no significant difference in EA between hard and recovery days ($p = 0.092$). Average EB on hard training days was −484 ± 4267kJ and on recovery training days was 572 ± 3265kJ, with no significant difference between training days ($p = 0.177$). Both genders showed no significant difference in EB between hard and recovery training days (females $p = 0.221$, males $p = 0.978$). The results suggest that adolescent rowers do not adjust their nutritional intake to match EEE. This may increase the risk of adolescent rowers presenting with suboptimal EB or EA, with females being at a greater risk than males.

Keywords: energy availability; adolescent athletes; low energy availability; periodised nutrition

Ethics Declaration

Yes

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