TACSM Abstract

The Effectiveness of the Critical Power Model on Prescribing Elements of Intermittent Exercise

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ABSTRACT

Intermittent exercise is a valuable method of training, consisting of numerous interrelated factors. The critical power model has been used to administer interval training programs; however, it has not been used to accurately prescribe elements of intermittent exercise. This study aimed to use individual critical power models to prescribe elements of intermittent exercise. Ten male athletes, mean (sd) age and mass 19.6 (1.4) years and 77.8 (8.1) kg performed three phases of testing on a cycle ergometer: **1)** familiarization, one learning trial to establish a starting point for subsequent tests; **2)** establishment of individual W/t relationship from [Eq 1], i.e. $t = W' / (W - W_{CP})$, 4 bouts of exercise designed to elicit fatigue in 2-15 minutes; **3)** intermittent exercise, 3 bouts of work with predicted number of work/recovery cycles (n = 5) of 60/60 s, 120/60 s, and 60/120 s. The elements of these bouts were prescribed using [Eq 2], i.e. $n = W' / ((W_w - W_{CP})t_w - (W_{CP} - W_r)t_r)$ and estimates of W' and CP from phase 2 of testing. One sample t-tests were used to compare the number of cycles actually completed to the predicted value of 5 cycles for each intermittent exercise bout. A repeated-measures ANOVA was used to compare the effect of intermittent exercise on the number of work/recovery cycles completed across conditions. The mean (sd) completed work/recovery cycles were 4.64 (0.47), 4.65 (1.10), and 3.70 (0.80), for the 60/60 s, 120/60 s, and 60/120 s trials, respectively. Results of the t-tests suggested that actual values were not significantly different from predicted for 60/60 s and 120/60 s ($t_{(9)}$ = -2.39, p = 0.04; $t_{(9)}$ = -1.01, p = 0.34), but were for 60/120 s ($t_{(9)}$ = -5.14, p < 0.01). Results of the rANOVA suggested that the mean completed work/recovery cycles was significantly different across conditions ($F_{(2,18)}$ = 3.99, p = 0.04). These data suggest that using [Eq 2], with estimates of W' and CP from [Eq 1], to prescribe elements of intermittent exercise can be successful for trials with short recovery periods.