The Effect of Physiological Performance Variables on 3000m Times in Collegiate Mid-Distance and Distance Runners

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Collegiately, mid-distance (MD) runners and distance (D) runners compete in the 3000m event. Previous research has identified VO$_2$max, velocity at lactate threshold (vLT), %VO$_2$max at lactate threshold, and running economy (RE) to correlate with 3000m performance. Research is lacking when considering if differences in these variables, and pacing strategy, affects 3000m performance between groups. PURPOSE: To identify how physiological performance variables relate to 3000m time, and if differences in these variables, and pacing strategies, occurs between groups. METHODS: 11 male NCAA Division II runners (5 MD, 6 D) were used. Subjects completed a 3000m time trial on a synthetic 200m indoor track, where 3000m time and split times were recorded using a single-beam timing gate. A discontinuous 3-minute stage lactate threshold protocol was used to measure vLT, lactate threshold (LT), and running economy at 14.5km/h, 16km/h, and 17.5 km/h (RE$_{14.5}$, RE$_{16}$, RE$_{17.5}$). A modified Astrand VO$_2$max test was used to assess VO$_2$max, with the speed set at 16.1km/h and grade increasing 2% every two minutes. RESULTS: VO$_2$max (r=-.629), RE$_{14.5}$ (r=.632), RE$_{16}$ (r=.756), %VO$_2$max at LT (r=0.675), 600-1200m time (r=.784), 1200-1800m time (r=.962), and 1800-2400m time (r=.719) significantly correlated to 3000m time (p<0.05), when merging subjects. In the D group, %VO$_2$max at LT (r=.875), RE$_{16}$ (r=.853), 600-1200m time (r=.882), and 1200-1800m time (r=.965) significantly correlated to 3000m time (p<0.05). In the MD group, 1200-1800m time (r=.932) significantly correlated to 3000m time (p<0.05), and VO$_2$max had a trend towards significance with 3000m time (r=-.829, p=.083). Statistically different mean differences in VO$_2$max (D=67.00±2.64 vs MD=63.56±1.52ml/kg/min), and vLT (D=15.10±0.19 vs MD=14.33±0.35km/h) was observed between groups (p<0.05). A graphical difference in pacing strategy was observed between groups. CONCLUSION: 1200-1800m time is the most important split time for 3000m performance. VO$_2$max was the best physiological performance indicator in MD runners, and RE$_{16}$ was the best physiological performance indicator in D runners. Runners should be trained differently according to their training status, to improve 3000m performance.