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### **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  $\text{VO}_2\text{max}$ , velocity at lactate threshold (vLT),  $\% \text{VO}_2\text{max}$  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 ( $\text{RE}_{14.5}$ ,  $\text{RE}_{16}$ ,  $\text{RE}_{17.5}$ ). A modified Astrand  $\text{VO}_2\text{max}$  test was used to assess  $\text{VO}_2\text{max}$ , with the speed set at 16.1km/h and grade increasing 2% every two minutes. **RESULTS:**  $\text{VO}_2\text{max}$  ( $r=-.629$ ),  $\text{RE}_{14.5}$  ( $r=.632$ ),  $\text{RE}_{16}$  ( $r=.756$ ),  $\% \text{VO}_2\text{max}$  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,  $\% \text{VO}_2\text{max}$  at LT ( $r=.875$ ),  $\text{RE}_{16}$  ( $r=.853$ ), 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  $\text{VO}_2\text{max}$  had a trend towards significance with 3000m time ( $r=-.829$ ,  $p=.083$ ). Statistically different mean differences in  $\text{VO}_2\text{max}$  ( $D=67.00\pm 2.64$  vs  $MD=63.56\pm 1.52\text{ml/kg/min}$ ), and vLT ( $D=15.10\pm 0.19$  vs  $MD=14.33\pm 0.35\text{km/h}$ ) 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.  $\text{VO}_2\text{max}$  was the best physiological performance indicator in MD runners, and  $\text{RE}_{16}$  was the best physiological performance indicator in D runners. Runners should be trained differently according to their training status, to improve 3000m performance.