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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 VO_2max , 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 ($\text{RE}_{14.5}$, RE_{16} , $\text{RE}_{17.5}$). A modified Astrand VO_2max test was used to assess VO_2max , with the speed set at 16.1km/h and grade increasing 2% every two minutes. **RESULTS:** VO_2max ($r=-.629$), $\text{RE}_{14.5}$ ($r=.632$), 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 ($r=.875$), 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_2max had a trend towards significance with 3000m time ($r=-.829$, $p=.083$). Statistically different mean differences in VO_2max ($D=67.00\pm 2.64$ 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. VO_2max 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.