

ABSTRACT

Most performance assessments on athletes involve an excessive amount of testing procedures. The efficacy of these tests is not always apparent, and their application is not always practical. Elite male middle-distance runners (n=20) were used to assess the physiological determinants of 800 meter running performance. We used testing methods recommended by the *South African Sports Commission*, which included body composition, joint flexibility, muscular strength, -power and -endurance, as well as a Wingate test (anaerobic capacity) and an isokinetic evaluation. An assessment of maximal running speed and acceleration at distances up to 300 meters was conducted on a standard tartan track. In addition, maximal oxygen consumption (VO_{2max}), running economy, *onset of blood lactate accumulation* (OBLA) and the *maximal accumulated oxygen deficit* (MAOD) were determined.

Measured values were correlated with competitive performance times using the Pearson product-moment correlation technique, with the Bonferroni correction for multiple comparisons. Wingate mean- and minimum power, as well as running times at 40, 60, 70, 80, 90, 150 and 300 meters were found to be significantly correlated to performance ($r^2 > 0.4$; $p < 0.01$). A multiple correlation comparison was used to determine a significant difference between correlations with performance time for the different variables. A stepwise multiple regression determined that 300 meter time-trial time was the strongest predictor of performance, accounting for 79% of the variability in performance, which was a better predictor of performance than a prediction model. The following formula was derived to estimate 800 meter performance from 300 meter time-trial time:

$$800m \text{ time} = 37.1062 + 2.17(300m \text{ time}) \quad [\text{time in seconds}]$$

The tests most able to predict 800 meter running performance were sport-specific track tests of high-speed running ability and tests of anaerobic capacity (especially the Wingate cycle ergometer test).