

Reliability of a 20 Km Time Trial on a Cycling Turbo Trainer

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Background: Exercise tests are one of the most commonly used tools within sports science research. Therefore, the reliability of such exercise tests is of critical importance when investigating the efficacy of nutritional, physiological, psychological or training interventions.

Purpose: The aim of this experiment was to measure the reliability of a 20 km cycling time trial performance test when performed by mounting the cyclists own bicycle frame on an electronic turbo trainer.

Methods: Twenty one male cyclists (age 35 ± 8 y, height 1.82 ± 0.05 m, body mass 80.7 ± 9.0 kg) completed the 20 km time trial on three separate occasions; the initial visit was a habituation trial and was followed by two main trials. All laboratory visits were conducted at the same time of day, following a 24h diet and activity standardisation period, and at least 2 h postprandial. The time trial was completed on a Cyclus2 (RBM Electronic, Germany) ergometer. The cyclists mounted their own bike frames on to the ergometer and the settings on the Cyclus2 were adjusted for each individual bike, ensuring an accurate measurement of distance and performance. During the exercise trial, participants were deprived of any performance information other than distance covered and gear selection; no encouragement was provided by experimenters.

Results: There was no order effect of the trials, inclusive of the habituation trial ($p = 0.901$). There was no significant difference in the time taken to complete the 20 km between trials 1 and 2 (trial 1: 1969 ± 112 s; trial 2: 1975 ± 119 s; $p = 0.222$). The intra-class correlation between trial 1 and 2 was $r = 0.99$, with the coefficient of variation being 0.7%.

Conclusions: The use of a 20 km cycling time trial, in which the cyclists bicycle frame is mounted on a cycle ergometer, is highly reproducible. Such a test can, therefore, be reliably used to detect changes in performance due to various interventions.