Effect of Warm-up on Cycle Time Trial Performance

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PURPOSE: This study was designed to determine the effect of warm-up on 3-km cycling time trial (TT) performance, and the influence of accelerated VO(2) kinetics on such effect. METHODS: Eight well-trained road cyclists, habituated to 3-km time trials, performed randomly ordered 3-km TT after a) no warm-up (NWU), b) easy warm-up (EWU) (15 min comprised of 5-min segments at 70, 80, and 90% of ventilatory threshold (VT) followed by 2 min of rest), or c) hard warm-up (HWU) (15 min comprised of 5-min segments at 70, 80, and 90% VT, plus 3 min at the respiratory compensation threshold (RCT) followed by 6 min of rest). VO(2) and power output (SRM), aerobic and anaerobic energy contributions, and VO(2) kinetics (mean response time to 63% of the VO(2) observed at 2 km) were determined throughout each TT. RESULTS: Three-kilometer TT performance was (P < 0.05) improved for both EWU (266.8 +/- 12.0 s) (-2.8%) and HWU (267.3 +/- 10.4 s) (-2.6%) versus NWU (274.4 +/- 12.1 s). The gain in performance was predominantly during the first 1000 m in both EWU (48% of gain) and HWU (53% of gain). This reflected a higher power output during the first 1000 m in both EWU (384 W) and HWU warm-up (386 W) versus NWU (344 W) trials. The mean response time was faster in both EWU (45 +/- 10 s) and HWU (41 +/- 12 s) versus NWU (52 +/- 13 s) trials. There were no differences in anaerobic power output during the trials, but aerobic power output during the first 1000 m was larger during both EWU (203 W) and HWU (208 W) versus NWU (163 W) trials. CONCLUSIONS: During endurance events of intermediate duration (4-5 min), performance is enhanced by warm-up irrespective of warm-up intensity. The improved performance is related to an acceleration of VO(2) kinetics.

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