Training prescription guided by heart rate variability in cycling

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PURPOSE: Road cycling is a sport with extreme physiological demands. Therefore, there is a need to find new strategies to improve performance. Heart rate variability (HRV) has been suggested as an effective alternative for prescribing training load against predefined training programs. The purpose of this study is to examine the effect of training prescription based on HRV in road cycling performance.

METHODS: Seventeen well-trained cyclists participated in this study. After an initial evaluation week (EW), cyclists performed 4 baseline weeks (BW) of standardized training to establish their resting HRV. Then, cyclists were divided into two groups, a HRV-guided group (HRV-G) and a traditional periodization group (TRAD) and they carried out 8 training weeks (TW). Cyclists performed two EW, after and before TW. During the EW, cyclists performed: (1) a graded exercise test to assess VO_2max, Peak power output (PPO) and ventilator thresholds with their corresponding power output (VT1, VT2, WVT1, and WVT2, respectively) and (2) a 40-min simulated time-trial.

RESULTS: HRV-G improved PPO (5.1 ± 4.5 %; p = 0.024), WVT2 (13.9 ± 8.8 %; p = 0.004) and 40TT (7.3 ± 4.5 %; p = 0.005). VO_2max and WVT1 remained similar. TRAD did not improve significantly after TW. There were no differences between groups. However, magnitude-based inference analysis showed likely beneficial and possibly beneficial effects for HRV-G instead of TRAD in 40TT and PPO, respectively.

CONCLUSIONS: Daily training prescription based on HRV could result in a better performance enhancement than a traditional periodization in well-trained cyclists.

Keywords: HRV; road cycling; periodization; endurance training; exercise performance