Individualising training intensity to reduce inter-individual variability in training response in trained cyclists
Ciaran O’Grady and James G. Hopker.

Abstract

Purpose: This investigation sought to determine whether using a PL could reduce IVV in VO2max response to training compared to using a standardised method.

Methods: Two groups of male cyclists completed 12 high intensity training (HIIT) sessions over 4 weeks. Training intensity was prescribed using PL models in the individualised group (IG; n=5, VO2max = 57.50 ± 9.02 mL.kg.min⁻¹) and set percentages of VO2max in the standardized group (SG; n=5, VO2max = 62.17 ± 4.45 mL.kg.min⁻¹). A VO2max test and performance time trial were completed pre- and post-training. PL’s were established using maximal efforts of 12, 7, and 3 minutes (Galbraith et al. [2014]. Journal of Sports Physiology and Performance, 9(6), 931–935). Training sessions consisted of 3 sets of 10 repetitions of 30 seconds work and 30 seconds recovery, with 5 minutes active recovery between sets. Statistical analyses were conducted using IBM SPSS Statistics 22, with between- and within-group comparisons completed using independent and paired samples t-tests, respectively. Variability was analysed using log-transformed coefficients of variation and Bland-Altman plots.

Results: VO2max was shown to have significantly increased in IG from 57.50 ± 9.02 mL.kg.min⁻¹ to 59.36 mL.kg.min⁻¹ following 4 weeks of HIIT training prescribed using a PL (P < 0.05). VO2max did not significantly improve in SG (P > 0.05). Intra-class correlation coefficients (ICC) showed that variability in VO2max response in both IG and SG was low, but significantly stronger correlations were observed in IG (P < 0.001) than in SG (P < 0.05). Individual VO2max response profiles indicate wider variation in response in SG, with two participants showing reduced VO2max, and a more consistent positive response in IG. Bland-Altman plots identify variance in VO2max response of + 4.39 ml.kg.min⁻¹ to - 0.69 ml.kg.min⁻¹ in IG and from + 8.86 ml.kg.min⁻¹ to – 6.23 ml.kg.min⁻¹ in SG.

Conclusion: The results of this study suggest that individualised HIIT training prescribed using a PL can reduce the IVV in VO2max response to training when compared to a standardised approach. This indicated that prescribing training using a PL model can result in consistent and predictable responses, useful for research, clinical, and applied purposes.

Keywords: training, individualisation, high-intensity, cycling, individual variability.

References
C. O’Grady and J Hopker (2016). Individualising training intensity to reduce inter-individual variability in training response in trained cyclists.


Contact email: cmao3@kent.ac.uk (C O’Grady)

1 Endurance Research Group, School of Sport and Exercise Sciences, University of Kent, UK.