

Impact of Interval Training on VO₂ Peak: Diminishing Returns with Increasing Intensity

James P. Raleigh, Matthew D. Giles, Brittany A. Edgett, Trisha D. Scribbans, Ryan B. Graham and Brendon J. Gurd.

Queen's University, Kingston, Ontario, Canada, Nipissing University, North Bay, Ontario, Canada

PURPOSE: High intensity interval training (HIIT) is a potent stimulus for increases in VO₂ peak, however, whether an optimal intensity for inducing adaptation exists is unknown. Therefore we examined the impact of multiple intensities of work-matched interval training on improvements in VO₂ peak and examined the individual variability in the adaptive response. **METHODS:** 36 healthy men and women completed 3 weeks of interval training on a cycle ergometer, consisting of 1 minute intervals at either 73% (age, 20.0 ± 0.9 yrs; VO₂peak, 40.8 ± 7.0 ml/min/kg), 103% (age, 20.0 ± 0.8 yrs; VO₂ peak, 41.6 ± 7.1 ml/min/kg) or 133% (age, 20.2 ± 1.1 yrs; VO₂ peak, 41.2 ± 7.3 ml/min/kg) of peak aerobic power. Training occurred 4 days per week. Intervals were separated by 1 minute of loadless cycling and total work performed per training session was matched across groups. All participants completed 3 VO₂ peak tests in the week preceding (pre) and in the week following (post) training. **RESULTS:** Training improved VO₂ peak in all groups with the increase following training at 103% VO₂ peak (5.8 ± 5.7 ml/min/kg), but not 133% (VO₂ peak, 4.2 ± 1.0 ml/min/kg) being greater than that following training at 73% (VO₂ peak, 2.7 ± 0.7 ml/min/kg). When the proportion of responders within each group was evaluated using a cut-point for a responder at 1 x the technical error of the mean, the greatest proportion of responders was observed in the 103% group (73%, 5/12; 103%, 12/13; 133%, 8/11). **CONCLUSION:** These data suggest that intervals performed at or near peak aerobic power may be optimal for inducing increases in VO₂ peak.