The effects of breathing supplemental oxygen during altitude training on cycle performance

- July 2000
- Journal of Science and Medicine in Sport 3(2):165-75

DOI:10.1016/S1440-2440(00)80078-X

- Source
- PubMed

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Abstract

To compare the training effects of doing high intensity intervals at 1,840 m in a normoxic vs. hyperoxic environment, eight cyclists (NORM) performed intervals on ergometers 3d/wk while breathing normoxic gas (P1O2 = 128 Torr), and seven subjects (HYPER) performed identical intervals at the same relative workload while breathing hyperoxic gas (P1O2 = 156 Torr). HYPER subjects were able to train at a higher percentage of their altitude lactate inflection point than were NORM subjects (HYPER = 126+/-2%, NORM = 109+/-3% $p<0.05$). Improvements in power output at maximal steady state (NORM = 8 W, HYPER = 20 W,) and improvement in time to complete a 120 kJ cycling performance test (NORM = 2 s, HYPER = 15 s) were significant in the HYPER group pre- vs. post-training ($p<0.05$) while the NORM group exhibited no significant changes. No significant changes in power output at lactate inflection point were seen in either group (NORM = -12 W, HYPER = +11 W). The results demonstrate that while training at moderate altitude, breathing hyperoxic gas vs. ambient air allows for higher training intensities and this higher intensity training results in significant improvements in maximal steady state power output and time to complete a 120 kJ performance test.