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Research article

No Additional Benefit of Repeat-Sprint Training in Hypoxia than in Normoxia on Sea-Level Repeat-Sprint Ability

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ABSTRACT

To assess the impact of 'top-up' normoxic or hypoxic repeat-sprint training on sea-level repeat-sprint ability, thirty team sport athletes were randomly split into three groups, which were matched in running repeat-sprint ability (RSA), cycling RSA and 20 m shuttle run performance. Two groups then performed 15 maximal cycling repeat-sprint training sessions over 5 weeks, in either normoxia (NORM) or hypoxia (HYP), while a third group acted as a control (CON). In the post-training cycling RSA test, both NORM (13.6%; p = 0.0001, and 8.6%; p = 0.001) and HYP (10.3%; p = 0.007, and 4.7%; p = 0.046) significantly improved overall mean and peak power output, respectively, whereas CON did not change (1.4%; p = 0.528, and -1.1%; p = 0.571, respectively); with only NORM demonstrating a moderate effect for improved mean and peak power output compared to CON. Running RSA demonstrated no significant between group differences; however, the mean sprint times improved significantly from pre- to post-training for CON (1.1%), NORM (1.8%), and HYP (2.3%).

Finally, there were no group differences in 20 m shuttle run performance. In conclusion, 'top-up' training improved performance in a task-specific activity (i.e. cycling); however, there was no additional benefit of conducting this 'top-up' training in hypoxia, since cycle RSA improved similarly in both HYP and NORM conditions. Regardless, the 'top-up' training had no significant impact on running RSA, therefore the use of cycle repeat-sprint training should be discouraged for team sport athletes due to limitations in specificity.

Key words: Hypoxic training, simulated altitude, top-up training, team sport

Key Points

- 'Top-up' repeat-sprint training performed on a cycle ergometer enhances cycle repeat-sprint ability compared to team sport training only in football players.
- The addition of moderate hypoxia to repeat-sprint training provides no additional performance benefits to sea-level repeat-sprint ability or endurance performance than normoxic repeat-sprint training.
- 'Top-up' cycling repeat-sprint training provides no significant additional benefit to running RSA or endurance performance than team sport training only, and therefore running based repeat-sprint interventions are recommended for team sport athletes.