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The effect of acute simulated moderate altitude on power, performance and pacing strategies in well-trained cyclists.

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Athletes regularly compete at 2,000-3,000 m altitude where peak oxygen consumption [Formula: see text] declines approximately 10-20%. Factors other than [Formula: see text] including gross efficiency (GE), power output, and pacing are all important for cycling performance. It is therefore imperative to understand how all these factors and not just [Formula: see text] are affected by acute hypobaric hypoxia to select athletes who can compete successfully at these altitudes. Ten well-trained, non-altitude-acclimatised male cyclists and triathletes completed cycling tests at four simulated altitudes (200, 1,200, 2,200, 3,200 m) in a randomised, counter-balanced order. The exercise protocol comprised 5 x 5-min submaximal efforts (50, 100, 150, 200 and 250 W) to determine submaximal [Formula: see text] and GE and, after 10-min rest, a 5-min maximal time-trial (5-minTT) to determine [Formula: see text] and mean power output (5-minTT(power)). [Formula: see text] declined 8.2 +/- 2.0, 13.9 +/- 2.9 and 22.5 +/- 3.8% at 1,200, 2,200 and 3,200 m compared with 200 m, respectively, $P < 0.05$. The corresponding decreases in 5-minTT(power) were 5.8 +/- 2.9, 10.3 +/- 4.3 and 19.8 +/- 3.5% ($P < 0.05$). GE during the 5-minTT was not different across the four altitudes. There was no change in submaximal [Formula: see text] at any of the simulated altitudes, however, submaximal efficiency decreased at 3,200 m compared with both 200 and 1,200 m. Despite substantially reduced power at simulated altitude, there was no difference in pacing at the four altitudes for athletes whose first trial was at 200 or 1,200 m; whereas athletes whose first trial was at 2,200 or 3,200 m tended to mis-pace that effort. In conclusion, during the 5-minTT there was a dose-response effect of hypoxia on both [Formula: see text] and 5-minTT(power) but no effect on GE.