

The Impact of Simulated Altitude on Selected Elements of Running Performance

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ABSTRACT

Background: Simulating altitude at sea level is increasingly more popular among recreationally-trained athletes across the sports spectrum. The AltO2Lab is a commercially-available, handheld, rebreathing apparatus purported to simulate altitude. Currently, there is an overall dearth of evidence regarding the efficacy of the device. **Purpose:** The goal of this study was to add evidence supporting or challenging the effectiveness of the device to improve selected running performance-related variables and to investigate the time-course of changes should benefits be evidenced. **Methods:** The 37-day protocol included familiarization, baseline, and 2 follow-up visits during which time hematological (hematocrit and lactate), physiological (running economy, maximal $\dot{V}O_{2\max}$, and heart rate), and psychological (Borg RPE) variables were monitored at rest, during relative submaximal, and/or maximal treadmill exercise. Altitude training days (18 days; one hour each day) were fitted within the 37-day time-line to occur after the baseline visit but before the respective follow-up visits. Specifically, the altitude training took place in 3, 6-day blocks of device usage with exposure, monitored by oximetry, intensifying across the days and blocks. Twelve days of altitude training were completed before the first follow-up visit while the final 6 days of altitude training were completed between the first and second follow-up visit. In this manner, the follow-ups could serve to evaluate the potential effectiveness of the device and narrow the time course of changes to a specific usage duration. **Results:** Six, recreationally-trained athletes (Females = 4; Males = 2; Age = 22.0 ± 2.9 yrs.; Baseline $\dot{V}O_{2\max}$ 52.7 ± 6.7) enrolled in the study. One subject was removed due to noncompliance. Overall, simulated altitude at the prescribed, intensifying dosage, failed to change both hematocrit ($p = 0.469$) and $\dot{V}O_{2\max}$ ($p = 0.184$) when analyzed by repeated measures analysis of variance. Additionally, no differences were found for secondary variables including: running economy, heart rate, lactate or RPE (all $p > 0.05$). **Conclusion:** Presently, the AltO2Lab failed to improve selected variables related to running performance. This finding is in contrast to previous investigations with the device but it does align with the knowledge that a stronger stimulus might be necessary to induce HIF-mediated erythropoiesis to the extent that the cascade could alter hematological and subsequently performance ability through enhanced oxygen-carrying capacity. These results are preliminary and a final cohort will complete testing before concluding results will be disseminated.