

Intermittent Inhalations of Concentrated Oxygen have a Transient Effect on Blood Oxygen Saturation at Very High Altitude: An Observational Study

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Background

- Canned oxygen products are widely available for consumer purchase and are often marketed towards individuals recreating at high altitude.
- Continuous oxygen supplementation is a well-established prevention and treatment for altitude-related illness.
- Little investigation has been done to evaluate any physiologic effect of intermittent inhalations of oxygen on individuals at altitude.

Objective

- To assess the physiological response to short bursts of inhaled oxygen among individuals recreating at high altitude.

Methods

- Observational cohort study investigating 50 individuals recreating at an altitude of 4307m (14,131ft)
- Baseline and peak SpO₂ levels were recorded as participants self-administered 1 and 3-stacked breaths of canned 95% oxygen.
- Paired t-test analyses were completed to compare baseline vs peak SpO₂.

Results

- Mean baseline oxygen saturation at rest was 83.9% (SD 5.52).
- Both 1 and 3 breaths resulted in an increase in blood oxygen saturation (mean absolute increase 9.3% and 8.2%, respectively).
- There was no difference between the magnitude of change in SpO₂ following one vs three breaths (p=0.11).
- Mean time to peak SpO₂ was 65.4s (SD 28.1).
- Following peak, SpO₂ showed an immediate downtrend, and 17 individuals (34%) fully returned to baseline within two minutes.

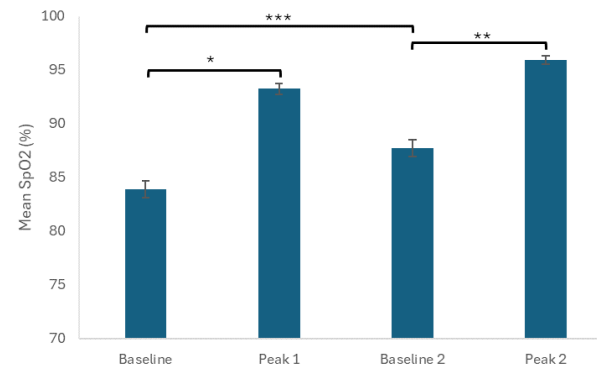


Figure 1 Mean SpO₂ (%) at baseline, peak 1 following 1 breath, baseline 2, and peak 2 following 3 stacked breaths. Error bars represent standard error of the mean and stars indicate statistical difference.

Conclusions

- Intermittent administration of concentrated oxygen resulted in a significant increase in blood oxygen saturation among healthy individuals at altitude.
- There was no difference between the magnitude of change following 1 vs 3 breaths.
- This rise in oxygen saturation is transient and not sustained.
- The transient nature of this effect suggests little clinical benefit of intermittent oxygen to counteract the health effects of high-altitude hypoxemia. More research is needed to characterize the therapeutic significance of this physiologic change.

References

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