The effects of normobaric hypoxia on CIVD and MBT following a bout of submaximal exercise

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Cold-induced vasodilation (CIVD) is a mechanism that protects the peripheries from cold-related injury. **PURPOSE:** The purpose of the current study was to investigate the effects of normobaric hypoxia on the thermoregulatory and CIVD response before and following submaximal exercise. **METHODS:** 10 apparently healthy men (23±3 years) volunteered for this study. The two experimental trials (13% O2 and 21% O2) were counterbalanced and blinded from the participant. Following a 60-min. acclimation the experimental trials consisted of two 15-min. exposures to 5ºC water of the non-dominant hand. The exposures were separated by a 30-min. bout of submaximal exercise producing the equivalent of 400 watts (W) of metabolic heat. Mean body temperature (MBT) and oxygen saturation (SaO2) were collected during the final 5 min. of each stage. CIVD was measured pre- and post-exercise during each of the cold-water exposures on the nailbed of the middle finger on the non-dominant hand. **RESULTS:** Onset time of CIVD was found to be significantly earlier in the 21% O2 condition compared to the 13% O2 condition ($p=0.043$). The cold exposure following exercise led to significantly earlier peak times of CIVD ($p=0.03$) in the 13% O2 condition. Amplitude was found to be significantly greater in the 21% O2 condition ($p=0.024$). In the 13% condition, the SaO2 reduction observed during exercise was significantly correlated to CIVD amplitude following exercise ($r=0.656$, $p=0.039$). In the 21% O2 condition, MBT following acclimation significantly correlated to the onset of CIVD following exercise ($r=-0.697$, $p=0.025$). Baseline MBT was also found to be significantly correlated to the amplitude of CIVD during the first and second cold-water exposures ($r=0.761$, $p=0.011$; $r=0.660$, $p=0.038$, respectively) in the 21% O2 condition. **CONCLUSION:** While at rest, normobaric hypoxia and a cold stress test appear to have minimal effect on MBT and the CIVD response. The amplitude of CIVD following exercise appears to be influenced by a reduction in SaO2 in normobaric hypoxia, while in normoxia, amplitude of CIVD is influenced more by baseline MBT.