Self-paced aerobic exercise performance is attenuated following four hours cold water immersion.

Hayden W. Hess[1], Zachary J. Schlader[1], Blair D. Johnson[1], and David Hostler[1], FACSM. [1]University at Buffalo, Buffalo, NY.

It is common for special warfare operators to complete land-based missions following prolonged transport dives. Time to exhaustion during high intensity aerobic exercise is attenuated following cold water submersion, which can be exacerbated when breathing oxygen (O_2). However, the high intensity time to exhaustion model may not be operationally relevant. **PURPOSE:** We tested the hypothesis that self-paced exercise performance following four hours cold water immersion is reduced compared to a non-immersed control, and that performance would be further reduced when breathing O_2 during immersion. **METHODS:** Six subjects (age: 24±2y; $\dot{V}O_{2max}$: 46±5 mL/kg/min) completed a baseline (CON) performance and two, 4 hour cold water immersion visits (20°C) breathing air or 100% O_2. During CON visit and following immersion, subjects completed a 60 minute loaded-march with 20% body mass (data not shown) followed by a self-paced 5 km run on a motorized treadmill. Core temperature, heart rate, and rating of perceived exertion (RPE) were recorded every 500 m during the run. **RESULTS:** 5 km run time was reduced following immersion while breathing 100% O_2 (p=0.01) and air (p=0.03) compared to the CON (33±7 min vs. 32±6 min vs. 29±5 min, respectively). However, there was no difference between air and O_2 (p=0.66). Core temperature increased during the 5 km run (p<0.001), but was not different between conditions (p=0.41). Heart rate increased during the 5 km run (p <0.001), but was not different between conditions (p=0.22). Finally, RPE increased during the run (p<0.001), but was not different between conditions (p=0.69). **CONCLUSION:** This interim analysis suggests that prolonged cold water immersion attenuates self-paced aerobic endurance performance, but does not appear to be further affected by breathing gas type (i.e., air vs. O_2). The mechanisms for this attenuated post-immersion performance remain largely unknown.