Mid Atlantic Regional Chapter
of the
American College of Sports Medicine

Annual Scientific Meeting, November 1st – 2nd, 2019
Conference Proceedings
International Journal of Exercise Science, Volume 9, Issue 8

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

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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.

Partial support from the Marc Diamond Research Fund (Grant # FA-18-07)