ABSTRACT

Positive end-expiratory pressure (PEEP) provides benefits to pulmonary patients, yet effects in healthy, exercising adults are unknown. **PURPOSE:** We designed two experiments (EXP) to test a novel PEEP (4.2 cmH2O PEEP) mouthpiece (PMP) on maximal cycling performance of physically active volunteers.

**METHODS:** EXP-1 PMP vs. control (CON) mouthpiece (N=9, Age=30±2 yr, Weight=72.2±3.7 kg, BMI=24.4±1.2, 5♂); and EXP-2 PMP vs. no mouthpiece (NMP) (N=10, Age=27±1 yr, Weight=76.7±3.6 kg, BMI=23.9±0.8, 3♂). Exercise test procedures for both experiments were identical. On Day 1, under the first mouthpiece condition assigned at random subjects performed graded exercise cycling testing (GXT) (Corival®) for VO2peak (ml*kg*min⁻¹), oxygen pulse (mlO2*bt) (O2pulse), GXT endurance time (s) (GXT-T), and VO2(ml*kg*min⁻¹)-at-ventilatory-threshold (VO2@VT). Subjects returned 72 h later (Day 2), to complete an endurance ride timed (s) to exhaustion (VTER) at an intensity equivalent to their VO2@VT power (W). One week later, subjects repeated exercise testing protocols (Days 3 & 4, time-of-day controlled) under the alternate mouthpiece condition. **RESULTS:** Selected outcomes were as follows (paired T-test, *p<0.05) PMP vs. CON, respectively: VO2peak = 45.2±2.4* vs. 42.4±2.3; VO2@VT = 33.7±2.0 vs. 32.3±1.6; GXT-T = 521.7±73.4* vs. 495.3±72.8; VTER = 846.2±166.0 vs. 743.1±124.7; O2pulse = 24.5±1.4* vs. 23.1±1.3. PMP vs. NMP, respectively: VO2peak = 43.3±1.6* vs. 41.7±1.6; VO2@AT = 31.1±1.2* vs. 29.1±1.3; GXT-T = 511.7±49.6 vs. 486.4±49.6; VTER = 872.4±134.0 vs. 792.9±122.4; O2pulse = 24.1±0.9* vs. 23.4±0.9. **CONCLUSION:** These results demonstrate that the novel PEEP mouthpiece we tested confers a significant performance benefit to cyclists completing high intensity exercise. By extension, it is likely to be an advantage in any physical activity having an aerobic component.