TACSM Abstract

Chronic Effects of an Elevation Training Mask on Aerobic Capacity, Anaerobic Endurance, and Pulmonary Function

TYLER HEIMDAL, LAVAN RAJAN, JUSTIN VICKERY, UJALASHAH DHANANI, JOSHUA HARRIS, MICHAEL MORENO, DAVID HUSTON, PATRICK MCCULLOCH, and BRADLEY LAMBERT

Orthopedic Biomechanics Research Laboratory; Department of Orthopedics & Sports Medicine; Houston Methodist Hospital; Houston, TX

Category: Undergraduate

Advisor / Mentor: Lambert, Bradley (bslambert@houstonmethodist.org)

ABSTRACT

Elevation training masks (ETM) have become popular in active/training populations to enhance performance via purported adaptations associated with altitude and respiratory muscle training. **PURPOSE**: To compare the effect of training with (TM) to without (CON) wearing the ETM. **METHODS:** 22 heathy adults (TM: ♂5, ♀6; 27.64±0.86 yr; 23.17±0.88 kg·m² | CON: ♂5, ♀6; 29.91±1.63 yr; 24.75±1.03 kg·m²) provided informed consent for this study. VO_2max and time to exhaustion were assessed (Bruce protocol GXT, w/ & w/o ETM). Anaerobic endurance was assessed using two consecutive 300-yrd shuttle sprints (5min rest). Pulmonary function was assessed using a metabolic cart. Following group assignment (TM and CON), subjects trained 3d/wk for 12 wks alternating between steady state running (Progression: 65->85% VO2max, 30->45min) and sprint conditioning every other session with VO_2max reassessment following wk 6. The TM group performed all sessions wearing the ETM at manufacturer reported simulated altitude of 9,000 ft. A (2)group x (2)time ANCOVA followed by a Tukey's post-hoc test was used to detect within and between group differences following training. Type I error set at α=0.05. **RESULTS (Table):** The TM group was found to have a lower improvements in aerobic as well as anaerobic capacity compared to the CON group ($p<0.05$) with reduced reductions in % body fat ($p<0.05$). No between group differences were observed for pulmonary function measures. **CONCLUSION:** Training w/ the ETM does not enhance, and may inhibit, improvements in aerobic or anaerobic endurance compared to standard training. However, further study is required to determine if there may be adaptive benefits to ETM training for those who typically perform under restricted breathing conditions.

GROUPS	AEROBIC CAPACITY: ΔVO₂max (ml/kg/min)	ΔUnmasked Time to Exhaustion (sec)	ΔMasked Time to Exhaustion (sec)
TM	4.3 ± 1.0 † *	63.2 ± 6.8 † *	82.1 ± 12.6 †
CON	6.8 ± 1.2 †	82.5 ± 9.1 †	71.9 ± 7.7 †
	BODY COMPOSITION	**300 YRD SHUTTLE (sec)**	
	Δ% Body Fat	**ΔUnmasked Sprint Time**	
TM	-1.00 ± 0.32 † *	-4.66 ± 0.9 † *	
CON	-2.17 ± 0.52 †	-8.43. ± 1.3 †	
	ΔLean Mass (g.)	**ΔMasked Sprint Time**	
TM	922 ± 303 †	-5.75 ± 0.83 †	
CON	1432 ± 320 †	-10.63 ± 2.94 †	
	PULMONARY FUNCTION		
	ΔFVC (L.)	**ΔMVV (L/min)**	
TM	0.051 ± 0.036	11.36 ± 5.51 †	
CON	0.045 ± 0.065	12.45 ± 3.94 †	

Data are means ± SEM. † sig. change from baseline within group ($p< 0.05$); * sig. difference from CON group ($p<0.05$),