wet weight of muscle tissue was lower during LEAK respiration following 21 days of BR (P=0.024). LEAK respiration was measured in the presence of pyruvate and malate and in the absence of ADP. OXPHOS and ETS capacity showed a moderate decline following BR. Citrate synthase activity was significantly reduced (P=0.01). Conclusion: A reduction in LEAK respiration is an indicator of reduced mitochondrial uncoupling which, independently of mitochondrial content, has been associated with an increase in reactive oxygen species (ROS) production and dysregulation of lipid metabolism in skeletal muscle. Such changes may lead to altered cellular metabolism, ectopic fat storage and insulin resistance. Physical inactivity-mediated reductions in oxidative metabolism may inhibit skeletal muscle function and metabolism. Lim, S. S., T. Vos, et al. (2013). 'A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010.' The Lancet 380(9859): 2224-2260.

CRITICAL VELOCITY AND HIGH INTENSITY TRAINING FOR A RECREATIONALLY ACTIVE POPULATION

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Introduction The use of high intensity interval training has gained considerable attention in recent years due to lack of free time being a factor in low levels of physical activity (Trost et al. 2002). Critical velocity is defined as peak power output (watts), which can be maintained over a 3-minute period. The exercise prescription in this current study is based on participant's 170% critical velocity. The aim of the current study was to assess the effect of the exercise prescribed using the critical velocity model of high intensity interval training on a recreationally active population. Methods Six recreationally active men and three recreationally active women (n =9) volunteered to participate in the study. Participants undertook testing pre- and post-intervention including anthropometric and maximal oxygen uptake (graded exercise test GXT). Each participant undertook 6 sessions over a 2-week period no less than 24 hours apart. The protocol consisted of 5 bouts of 20 seconds at 170% of participants critical velocity (determined from GXT) interspersed with 100 seconds of low intensity exercise at 50 watts. A warm up and cool down were preformed pre- and post-protocol, adding up to a total time commitment of 16 minutes. Workloads elicited 90-100% of maximum heart rate and 90–100% of maximal oxygen consumption. Data is communicated as mean ± standard deviation. To evaluate systematic differences, a paired t-test on the test re-test data was performed. Results The results show no significant changes across anthropometric data; weight (76.8±15 vs. 76.6±14.7 kg), BMI (25.8±4.4 vs. 26.1±4.2), body fat percentage (22.8±7.1 vs. 22.5÷6.7 %bf) or fat free mass (58.3±9.6 vs. 58.4±9.6 kg) pre and post-intervention. There was statistically significant change in both VO2max ¬P=0.014 ¬ (34±6.6 vs. 37.25±6.8* ml/kg/min) and VO2peak P=0.002 (38.9±7 vs. 41.4±7.2* ml/kg/min). There was also a statistically significant increase in participant's time to exhaustion P=0.001 (24.6±6.3 vs. 28.3±6.3* mins). Although not statistically significant (P=0.05) there was a decrease in session RPE from session 1 to session 6 (14.5±2.4 vs. 12.5±2.5). Discussion These findings provide novel information regarding the potency of the critical velocity model to prescribe exercise, indicating that it may offer a time-efficient alternative to conventional cardiorespiratory exercise training for improving health. It also suggests that the critical velocity model may be a practical alternative to sprint interval training (Wingate training), as it doesn't require 'all out' efforts or specialized equipment, while providing similar benefits (Burgomaster et al. 2008). References Rakobowchuk M, et al. (2008) Journal of physiology 295; R236-242 Trost SG et al. (2002) Med Sci Sports Exerc 34: 1996-2001 Contact Brian.hughes@ittd.ie

SPEEDING OF V'O2 KINETICS IN RESPONSE TO HIGH-INTENSITY-INTERVAL TRAINING IN OLDER, HEALTHY MEN

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Introduction Experimental evidence suggests that High Intensity Interval Training (HIT, high intensity - low volume exercise) may be effective in accelerating the dynamic response pulmonary O2 uptake (V'O2) in older subjects through an improvement of the matching between local O2 delivery and uptake (Williams et al., 2013). This study explores the effect of HIT on V'O2 kinetics and muscle deoxygenating during step transitions of moderate intensity, cycling exercise in older, healthy men. Methods 12 moderately active older adults (68-yy ± 4) were exposed to 8 weeks of HIT training with 7 two-minute repetitions at 40 and 90% of V 'O2max, 3 times a week. Before and after training we measured: i) V'O2 peak (V'O2p), gas exchange threshold (GET) and respiratory compensation point (RCP) during an incremental test up to exhaustion; ii) breath-by-breath V'O2 and change of fractional muscle O2 extraction (ΔHHb) of vastus lateralis by quantitative NIRS during three step-exercise transitions performed at a workload corresponding to 90% of GET. V'O2 kinetics was modeled, after synchronization and overlapping of the three series, by means of a double - exponential function so that we estimated the time constant (Tau) of the primary component of VO2 kinetics. Finally, the normalized ΔHHb to ΔV'O2 ratio was obtained as index of the matching between muscular O2 delivery and uptake (De Roia et al., 2012; Murias et al., 2011). Results V'O2max increased by 9% (29.9 mL min-1 kg-1 ±4.3 - 32.6 mL min-1 kg-1± 6.0, p<0.01, ES 0.51) after 8 weeks of HIT. RCP (respiratory compensation point, per cent of V'O2max) significantly improved by 10% (76.4 % ± 8.3 - 82.9 % ± 4.9, p<0.05, ES 0.97); Tau decreased by about 26% (26.97 s ± 5.54 - 19.63 s ± 4.31, p<0.001, ES 1.48), suggesting a substantial acceleration of V'O2 kinetics; peak value of ΔHHb to ΔV'O2 ratio was smaller after HIT (~ 29%) (1.83 ± 0.63 - 1.23 ± 0.37, p<0.01, ES 1.17). Discussion This study shows that 8 weeks of HIT were sufficient to induce a significant acceleration of V'O2 kinetics during moderate intensity exercise and to improve the matching between muscular O2 delivery and uptake in older, healthy men. These results suggest that the acceleration of the dynamic response of aerobic metabolism was due to an improved matching of O2 utilization to microvascular delivery. References Williams AM, Paterson DH, Kowalchuk JM. (2013) J Appl Physiol 114, 1550–1562. De Roia G, Pogliaghi S, Adami A, Papadopoulou C, Capelli C. (2012) Am J Physiol Regul Integr Comp Physiol. 302, R1158-R1166. Murias JM, Spencer MD, DeLorey DS, Gurd BJ, Kowalchuk JM, Paterson DH. (2011) J Appl Physiol 111, 1410–1415. Contacts Carlo.capelli@univr.it

STRESS TOLERANCE DURING FIGHTING FLIGHTS IS MEDIATED BY AEROBIC FITNESS AND BODY COMPOSITION

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STRESS TOLERANCE DURING FIGHTING FLIGHTS IS MEDIATED BY AEROBIC FITNESS AND BODY COMPOSITION UCB (Brasilia, Brazil):1; UniEvangelica (Anapolis, Brazil):2 Introduction Fighting pilots are exposed to high levels of stress during combat missions. Change in gravitational forces (G-force), among other factors, is the main source of stress. Recently, Dussault et al. (2009) reported a relationship between flight duration and sympathovagal acute adaptations as measured by means of heart rate variability (HRV) before and after training missions. However, the factors that influence on autonomic responses during flights have not been explored yet. Meanwhile, the