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3215 Board #120 June 2 3:30 PM - 5:00 PM

**Diminished Ventilatory Responses During Post-Exertional Malaise Contributes to Exercise Intolerance in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome**

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(No relationships reported)

Reduced functional capacity and post-exertional malaise following physical activity are hallmark symptoms of Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS). The mechanisms producing exercise intolerance in the post-exertional state have not been adequately described.

**PURPOSE:** To compare the ventilatory response to repeated exercise stress in control and ME/CFS subjects.

**METHODS:** 40 female subjects were recruited for the study, 20 ME/CFS patients and 20 age and weight matched controls. All underwent two maximal exercise tests 24 hours apart. Oxygen consumption, minute ventilation ( $V_E$ ), tidal volume (TV), respiratory rate (RR), end-tidal oxygen and carbon dioxide ( $ET_{O_2}/ET_{CO_2}$ ) were measured at rest, at the anaerobic threshold, and at maximal exercise. Multivariate analyses were performed for group (ME/CFS vs control), test (exercise test 1 vs test 2), and condition (rest vs anaerobic threshold vs maximal exertion) with univariate follow up.

**RESULTS:** 15 ME/CFS subjects and 18 control subject reached criteria for maximal effort. The overall multivariate analysis was significant for group and condition. Follow-up univariate and post-hoc showed  $VO_2$ ,  $V_E$  and TV were lower in the ME/CFS group only on exercise test 2. Post hoc for condition was significant for ventilation at maximal exercise only. Respiratory rate,  $ET_{O_2}$ , and  $ET_{CO_2}$  were not different between tests or groups.

**CONCLUSION:** In the absence of a second exercise test, the lack of any significant differences for the first test would appear to suggest no exercise intolerance in ME/CFS patients. However, the results from the second test indicate the presence of exercise intolerance and post-exertional malaise. Diminished ventilatory responses accompany reductions in work output and oxygen consumption during post exertional malaise in ME/CFS patients.

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3216 Board #121 June 2 3:30 PM - 5:00 PM

**Leg Blood Flow and Fatigability In People With Type 2 Diabetes**

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(No relationships reported)

We have previously demonstrated that people with type 2 diabetes mellitus (T2D) have greater fatigability of the knee extensor muscles during a dynamic fatiguing contraction due to impairments within the skeletal muscle; however, the precise mechanism(s) are unknown.

**PURPOSE:** To determine if impairments in leg blood flow are associated with greater fatigability of the knee extensor muscles during a dynamic fatiguing contraction in men and women with T2D.

**METHODS:** 5 individuals with non-insulin dependent T2D (60 - 70 years; 3 women) with no signs of diabetic neuropathy were matched based on age, BMI and physical activity with four non-diabetic controls (CON) (60 - 68 years; 2 women). Physical activity was assessed over four days with a tri-axial accelerometer. To assess fatigability, participants performed a 6-minute single-limb dynamic fatiguing contractions with the knee extensors while seated at 90° of hip and knee flexion. 120 maximal voluntary concentric contractions (MVCCs) were performed with a load equivalent to 20% maximal voluntary isometric contraction torque through a 90° range of motion. Doppler ultrasonography was used to assess femoral artery diameter and pulse wave blood velocity before and immediately after the dynamic fatiguing contraction.

**RESULTS:** The reduction in MVCC power was greater for T2D ( $40.5 \pm 17.6\%$ ) compared with CON ( $31.3 \pm 20.8\%$ ,  $P < 0.05$ ) as assessed at the end of exercise. T2D and CON both demonstrated similar increases in leg blood flow after the dynamic fatiguing contraction ( $71.7 \pm 41.1\%$  vs.  $69.0 \pm 37.3\%$ , respectively;  $p > 0.05$ ). However, greater reductions in MVCC power (i.e. greater fatigability) was associated with lower blood flow following dynamic fatiguing contractions ( $p = 0.034$ ,  $r = 0.633$ ).

**CONCLUSIONS:** Greater fatigability of the knee extensor muscles during dynamic fatiguing contractions was associated with lower blood flow. Impaired blood flow responses to exercise may limit exercise performance among T2D, and this work highlights the need for future studies that examine skeletal muscle perfusion during dynamic exercise in people with T2D.

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3217 Board #122 June 2 3:30 PM - 5:00 PM

**Prolonged Bouts Of Sedentary Behavior Are Associated With Cardiometabolic Disease Risk Factors In Young Adults**

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(No relationships reported)

Research indicates sedentary behavior is associated with obesity and cardiometabolic disease (CMD) risk factors. Less understood is the effect of prolonged bouts of sedentary time on CMD risk factors, particularly in young adults.

**PURPOSE:** To determine the associations among prolonged bouts of sedentary behavior and CMD risk factors in young adults.

**METHODS:** 125 men (n=29) and women (n=96) participated in the study (mean  $\pm$  SD: age  $22.8 \pm 4.8$  y; BMI  $26.4 \pm 4.7$  kg/m<sup>2</sup>; body fat  $29.1 \pm 9.4\%$ ; and  $VO_{2peak}$   $40.9 \pm 8.3$  mL/kg/min). Sedentary behavior (<150 counts/min) and moderate-to-vigorous physical activity (MVPA, >2689 counts/min) were measured by an accelerometer worn during waking hours for 7 consecutive days. Sedentary bouts were defined as greater than or equal to 20, 30 and 60 min. Body composition, waist circumference, blood pressure, glucose, insulin, triglycerides (TG), high-density lipoprotein, and low density lipoprotein (LDL) cholesterol were measured. Multiple regression analyses were used to assess associations among variables, while controlling for age, sex, race/ethnicity, accelerometer wear time and MVPA.

**RESULTS:** Total time spent in sedentary behaviors averaged  $8.7 \pm 1.5$  h/day. Sedentary bouts greater than or equal to 20, 30 and 60 min accounted for 36%, 23%, and 6% of total sedentary time, respectively. The average length for bouts of greater than or equal to 20, 30, and 60 min was  $33.7 \pm 4.1$  min,  $45.6 \pm 6.6$  min and  $63.7 \pm 40.5$  min, respectively. Sedentary bouts of 20 min or more had the strongest relationships with CMD risk factors, compared to bouts of 30 and 60 min or more. Time spent in sedentary bouts of 20 min or more was independently associated with BMI ( $R^2=0.13$ ,  $\beta=0.24$ ,  $p=0.01$ ), waist circumference ( $R^2=0.15$ ,  $\beta=0.25$ ,  $p=0.01$ ), LDL ( $R^2=0.28$ ,  $\beta=0.27$ ,  $p<0.01$ ), TG ( $R^2=0.11$ ,  $\beta=0.25$ ,  $p=0.02$ ), insulin ( $R^2=0.55$ ,  $\beta=0.25$ ,  $p<0.01$ ), and fat mass ( $R^2=0.23$ ,  $\beta=0.27$ ,  $p<0.01$ ), after adjusting for all covariates.

**CONCLUSIONS:** Our novel findings suggest that sedentary behavior, in bouts of 20 min or more, is significantly and independently associated with markers of CMD in young adults. These findings have important implications for CVD prevention programs for young adults and suggest that public health guidelines with regards to minimizing prolonged sedentary behaviors are warranted.

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