

**METHODS:** Twenty-one subjects (14 males, 7 females) attended two visits with 48-72h separation. At each visit they performed four different exercises (SQ, SS, DBP, OHP) in the same order and with the same resistance during which movement was recorded with the Iron Path Pro Application Version 2.2. Additionally, the app recorded velocity, acceleration, bar distance, and force. At the second visit subjects were randomized to either receive a description on correct SQ and OHP technique or not. Height, body mass, humerus and femur length were measured and resistance training experience and frequency were reported via survey. Two-way mixed ANOVA with repeated measures was used to determine differences between the first and second visit (time) and explanation and non-explanation (condition).

**RESULTS:** The subjects had the following descriptive statistics: age of  $21.4 \pm 1.6$  yrs, body mass of  $79.38 \pm 23.71$  kg, height of  $1.77 \pm 0.10$  m, femur length  $0.45 \pm 0.05$  m, humerus length  $0.35 \pm 0.05$  m, lifting experience of  $4.68 \pm 3.45$  yrs, and lifting session  $2.6 \pm 1.63$  days per week. No significant ( $p > 0.05$ ) condition, time, or condition x time effects were found for either peak velocity or peak acceleration for the SS, SQ, DBP, and OHP.

**CONCLUSION:** These data show that neither repeated trials (time) or condition had a significant impact on peak velocity and peak acceleration in SS, SQ, DBP, or OHP in this sample of young, resistance trained subjects.

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## D-58 Free Communication/Poster - Renal Physiology

Thursday, May 31, 2018, 1:00 PM - 6:00 PM  
Room: CC-Hall B

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1793 Board #54 May 31 3:30 PM - 5:00 PM

### The Effect of Dietary Nitrates on Exercise Capacity in Chronic Kidney Disease

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(No relevant relationships reported)

**PURPOSE:** The purpose of this study was to test the hypothesis that an acute dose of 12.6mmol dietary nitrate in the form of concentrated beetroot juice (BRJ) would improve exercise capacity and skeletal muscle mitochondria function in adults with moderate to severe chronic kidney disease (CKD).

**METHODS:** 12 individuals with moderate to severe CKD participated in this study ( $61 \pm 4$  yrs; 9 males; eGFR  $47.8 \text{ ml} \cdot \text{min}^{-1} \cdot 1.73 \text{ m}^2$ ). Participants reported to the laboratory and a baseline blood sample was obtained for determination of NO metabolites (NOm; Nitrate, nitrite, s-nitrosothiols and metal bound NO). Participants were then randomized to ingest 12.6mmol of BRJ or a nitrate depleted placebo (PLA). Exercise testing began 2.5 hours post beverage ingestion to coincide with peak plasma nitrite levels. Skeletal muscle mitochondrial oxidative function testing was performed using near infrared spectroscopy (NIRS) followed by a symptom limited graded exercise test (GXT) on a cycle ergometer for determination of peak oxygen consumption ( $\text{VO}_2$  peak). Participants repeated the entire protocol in the other condition a minimum of 7 days later.

**RESULTS:** Plasma NOm values were significantly increased in the BRJ condition 2.5 hours post ingestion compared to BRJ baseline as well as PLA at 2.5 hr (2.5 hr: PLA  $30.2 \pm 6.6 \mu\text{M}$  vs BRJ  $97.3 \pm 26.1 \mu\text{M}$ ,  $p > 0.05$ ). We did not observe an improvement in mitochondrial oxidative capacity or  $\text{VO}_2$  peak in the BRJ condition compared to PLA ( $p > 0.05$ ). The amount of work performed and total exercise time was significantly increased after BRJ compared to PLA (Work: PLA  $39.5 \pm 9.9$  vs BRJ  $44.7 \pm 10.7 \text{ kJ}$ ; Exercise Time: PLA  $627 \pm 86$  vs BRJ  $674 \pm 85$  seconds;  $p < 0.05$  for both).  $\text{VO}_2$  at the ventilatory threshold (VT) was significantly greater in the BRJ condition compared to PLA (PLA  $0.79 \pm 0.08 \text{ L/min}$  vs BRJ  $0.95 \pm 0.09 \text{ L/min}$ ;  $p < 0.05$ ).

**CONCLUSION:** An acute dose of 12.6mmol dietary nitrate significantly improved  $\text{VO}_2$  at VT, work performed, and total exercise time in adults with moderate to severe CKD. This research was supported by an ACSM Foundation Research Grant from the American College of Sports Medicine Foundation and NIH grant HL113514.

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1794 Board #55 May 31 3:30 PM - 5:00 PM

### The Kidney As A Hub For Ph Modulation: Interrelationship Of Lactate, Pulse, And Blood Pressure

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(No relevant relationships reported)

Following the pioneering work of Hill and Meyerhoff, in 1933, Margaria and colleagues published a compelling relationship between pH and lactate in the blood. In 1976, Sahlin and colleagues detected and presented that same relationship in skeletal muscle. These events helped make lactate metabolism one of the most famous and misunderstood phenomena in exercise physiology. We now know that rates of ATP hydrolysis and hydrogen ion clearance are fundamental to exercise-induced metabolic acidosis; however, the role of the kidney in modulation of blood lactate and pH still requires further elucidation in athletic and ill populations.

**PURPOSE:** To better understand the determinants of blood pH by examining the interrelationship between lactate, pH, and cardiovascular parameters in a patient population.

**METHODS:** We analyzed a sample of 248 patients who were admitted to a Midwestern U.S. hospital for acute trauma. All patients were assessed for predictors of pH based on complete blood count and other measurements collected during intake. Multiple linear regression tested the effect of demographic, anthropometric, and metabolic variables on blood pH. **RESULTS:** Subjects were 63.3% male with a mean age of  $50.5 \pm 21.6$  years, normal blood pH ( $7.3 \pm 0.4$ ), and slightly elevated lactate ( $2.0 \pm 1.7 \text{ mmol/L}$ ). Mean arterial pressure ( $98.5 \pm 18.5 \text{ mmHg}$ ) and heart rate ( $90.7 \pm 18.1 \text{ bpm}$ ) were also slightly elevated. The variables that predicted significant reductions in pH were lactate ( $p < 0.001$ ) and pulse rate ( $p = 0.040$ ). The variables that predicted significant increase in pH were mean arterial blood pressure ( $p = 0.001$ ), temperature ( $p = 0.010$ ), and pregnancy status ( $p = 0.026$ ). Sex ( $p = 0.316$ ), age ( $p = 0.714$ ), obesity ( $p = 0.195$ ), and blood alcohol content ( $p = 0.624$ ) were not statistically significant. Injury severity score was a trending predictor ( $p = 0.057$ ).

**CONCLUSIONS:** The strong association between lactate and pH may indicate a need to re-examine components of the lactate/pH framework. The associations between blood pressure, pulse, and pH implicate the kidney; further work needs to be done in outlining renal function and its role in modulation of pH and cardiovascular function.

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1795 Board #56 May 31 3:30 PM - 5:00 PM

### Home-based Exercise Improves Heart Contractility Determined by 2D Speckle Tracking Strain in Renal Transplant Recipients

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(No relevant relationships reported)

**PURPOSE:** Renal transplant recipients (RTR) are at high risk for adverse cardiovascular events due to potential cardiotoxic effects of multiple drug therapies and often sedentary behavior. Moderate intensity exercise has been shown to decrease the risk of these potential events. The purpose of this study was to evaluate the changes in myocardial function using global longitudinal strain (GLS), mean strain (Lo) and ejection fraction (EF) determined from 2D speckle tracking strain (STS) before and after participation in a home-based aerobic and strength training program in RTR and to determine if there was a sex difference in the response.

**METHODS:** A group of 30 RTR's (12 females and 18 males, aged  $47.9 \pm 12.3$  y, BMI:  $24.4 \pm 3.9$ , average age at transplant  $38.6 \pm 13.1$  y) participated in an exercise program for 12 months. Individualized exercise programs were created based on the results of a cycle ergometer test, hand grip dynamometry, bioelectrical impedance and skinfold analysis with the goal of achieving 150 minutes\*wk<sup>-1</sup> of activity at moderate intensity (minimal levels were set at  $3 \times \text{week}^{-1}$  with a goal of at least 30 minutes\*session<sup>-1</sup>). Subjects completed 2D echocardiographic examination at T<sub>0</sub>, T<sub>6</sub>, and T<sub>12</sub> months. Repeated measure ANOVA and a two-way mixed ANOVA with Tukey post-hoc analysis were used to detect differences across time and sex differences.

**RESULTS:** GLS and Lo increased significantly from T<sub>0</sub> to T<sub>6</sub> and remained high at T<sub>12</sub> (GLS:  $-17.9 \pm 3.3$  vs  $-20.4 \pm 3.2$  and  $-20.5 \pm 3.8$  and Lo:  $-18.3 \pm 3.8$  vs  $-20.4 \pm 3.3$  and  $-20.4 \pm 3.0$ ) with no changes in EF over time (EF %  $60.4 \pm 5.3$  vs  $61.8 \pm 6.9$  and  $64.3 \pm 6.2$ ). Men were significantly older at time of transplant ( $33.8 \pm 12.6$  vs  $45.7 \pm 11.4$ ,  $p < 0.05$ ) with lower