CONCLUSIONS: The HIBC did not appear to be effective in improving markers of metabolic function or health-related physical fitness in the five participants. However, when removing a singular outlaying participant, several factors demonstrate substantial improvements in several outcome measures. HIBC may be an appropriate and appealing intervention for those with T2D.

1147 Board #5 May 30 9:30 AM - 11:30 AM

Effects of Novel Compression Exercise Technology on Glycohemoglobin Levels and Weight in Type II Diabetics

Chloe Wernecke[1], Richard Henderson[2], Cristian Torres[1]. [1]*Vasper Systems, Moffett Field, CA.* [2]*Covenant Medical, Lubbock, TX.*

***Reported Relationships: C. Wernecke:** Salary; Vasper Systems.*

The most potent lifestyle intervention for treatment of Type II Diabetes (T2D) is consistent exercise. However, for many patients with the condition, other comorbidities such as osteoarthritis, hypertension, and high body mass indexes prevent them from being able to exercise intensively and consistently enough to experience optimal metabolic benefits. Recent research has supported the use of compression exercise in physically limited populations and demonstrated physiologic responses at lower intensities (10-20% one repetition maximum vs. 70% for hypertrophic response in conventional resistance exercise). The combination of compression technology with core cooling further lowers the exertional requirements and has been used in cardiopulmonary rehabilitation populations to provide a safe and reliable exercise intervention. Compression exercise has also been shown to significantly increase muscle hypertrophy, with a greater growth in type II fibers (higher expressers of GLUT4). Therefore, this technology could directly address basal metabolism through increasing muscle protein turnover, increasing glucose storage in skeletal muscle mass, and improving glycemic control. This capacity to attenuate the insulin response combined with the accessibility of the platform suggests a clinical implication for diabetes management.

PURPOSE: To establish safe use of cooled compressive exercise in Type II Diabetics and to examine the effect of 6 months of training on biometabolic markers, especially Glycohemoglobin levels and weight.

METHODS: Thirty Type II Diabetics agreed to 3 training sessions a week for 6 months. Biometabolic markers via blood draw were analyzed at 0, 3, and 6 months.

RESULTS: Midpoint data from 16 participants at 0 and 3 months were analyzed with a two-tailed T-test, revealing significant differences in Glycohemoglobin and weight. There was an 8% average decrease in Glycohemoglobin levels (8.5±2.2 vs. 7.8±1.8 mg/dl, p = 0.002) and an average weight loss of 3.6 lbs (211±50 vs. 208±48 lbs, p = 0.032).

CONCLUSION: The preliminary results of this study suggest exercise with compression and cooling contributes to a reduction in biometabolic markers of diabetes. This intervention has promise in contributing to effective management of T2D with a low physical burden.

1148 Board #6 May 30 9:30 AM - 11:30 AM

Impact Of Short-term Exercise Training And Diet On Glucose Effectiveness Between Prediabetes Phenotypes

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(Sponsor: Steven K. Malin, FACSM)

(No relationships reported)

PURPOSE: Although exercise improves glucose effectiveness (GE) in adults with type 2 diabetes, the influence of exercise on GE across the prediabetes phenotypes is unknown. Additionally, the impact of dietary intake on GE after an exercise intervention is limited. The purpose of this study was to examine the effect of short-term exercise training and habitual dietary intake on GE in adults with impaired fasting glucose (IFG) compared with IFG plus impaired glucose tolerance (IFG+IGT).

METHODS: Female subjects (Age 59.4±7.2 yrs.; BMI 34.4±1.4 kg/m^2) were screened for IFG (n=7, FPG: 103.9±2.3 mg/dl; 2-hr glc: 116.7±7.2 mg/dl) and IFG+IGT (n=10 FPG: 99.1±3.5 mg/dl; 2-hr glc: 152.9±11.0 mg/dl) using ADA criteria (120 min 75g OGTT). Subjects underwent 12 bouts of exercise at ~70% of HR_{peak} for 60 min/d over 2-weeks. A 180 min, 75g OGTT was used to collect glucose and insulin to determine GE via a validated minimal model before and after training. VO_2peak and body composition (BIA) were also tested. Energy expenditure during training was calculated using a linear regression equation based on VO_2 and heart rate. Subjects were also asked to record their diet before and after the intervention using 3-d food logs.

RESULTS: Exercise training reduced BMI (P<0.05), but had no effect on lean body mass (LBM) or VO_2peak; and there was no difference in exercise energy expenditure in either group (all, P>0.72). However, adults with IFG+IGT increased GE post-training (within effect; P=0.02), and this rise in GE tended to be greater in IFG+IGT than IFG (0.23±0.08 vs. 0.00±0.08 mg/dl per min; P=0.059). Increased GE correlated with elevated LBM (r=0.42, P=0.09), but not reduced BMI (r=-0.08, P=0.75) or increased fitness (r=0.02, P=0.95). While dietary protein reduction was linked with increased GE (r=-0.49, P=0.05), no association was seen between GE and carbohydrates (r=-0.24, P=0.37), fat (r=-0.17, P=0.53) or total kcal (r=-0.23, P=0.40).

CONCLUSION: Independent of weight loss and fitness, short-term exercise training increased GE in adult women with IFG+IGT but not those with IFG. The results also suggest dietary protein may modulate the exercise effect on GE. Future work is needed to examine how nutrition can optimize exercise induced glucose regulation in individuals with prediabetes.

1149 Board #7 May 30 9:30 AM - 11:30 AM

Effect of Weight Loss on Physical Function in Overweight and Obese Individuals

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(No relationships reported)

Impaired physical function is a major health concern in obesity across the adult life-span. Reducing weight and improving body composition may be critical for improving physical function in overweight and obese adults.

PURPOSE: Investigate physical function before and during weight loss and study the relationships of body composition with changes in physical function.

METHODS: Data were obtained from women (n=127, age 49.3±12.8 years; weight 101.8±17.9 kg; BMI 37.8±6.6 kg/m^2) and men (n=17, age 54.4±10.1 years; weight 131.9±31.9 kg; BMI 40.5±9.9 kg/m^2) enrolled in a medical supervised comprehensive weight loss program at Wake Forest Baptist Health Weight Management Center. Mean follow up was 6.7 months. Body composition, grip strength, gait speed, chair rise time, and submaximal VO2max were determined before and at the end of follow-up. Paired samples t-tests analyzed changes between baseline and follow-up. Pearson correlations examined relationships between pre-and-post functional performance tests and fat free mass (FFM), and fat mass (FM).

RESULTS: Mean weight loss was 11.8±9.8 kg. Approximately 74.9% of weight loss was from fat mass: [FM (48.3±18.5 kg at baseline and 38.9±12.7 kg at follow-up, p<.001) and FFM (57.9±10.6 kg at baseline and 55.7±10.9 kg at follow-up, p<.001)]. Grip strength (29.3±8.1 to 32.9±11.2 kg, p<.001), chair rise time (9.1±2.9 to 7.8±2.7 s, p=.018), gait speed (1.2±0.2 to 1.3±0.2 m/s, p=.001), and submaximal $VO_{2,max}$ (32.7±3.9 to 34.7±4.5 ml/kg/min, p<.001) all improved from baseline to follow-up, respectively. Gait speed (r= -.292, p=.005) grip strength (r= -.215, p=.041) and chair rise (r= -.273, p=.009) changes were correlated with FM changes but not FFM changes.

CONCLUSIONS: A comprehensive weight loss generally improves physical function. This improvement is possibly mediated by FM losses rather than FFM changes.

1150 Board #8 May 30 9:30 AM - 11:30 AM

Sex-Specific HbA1c Responses to Structured Exercise Among Patients with Type 2 Diabetes

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(No relationships reported)

In the United States, 1 in every 9 adult women and 1 in every 8 adult men have diabetes; 95% of these cases are Type 2 diabetes. The efficacy of exercise training as an intervention for treatment is likely attributed to a combination of biological and environmental factors, including age, physical fitness, and sex. Despite the large number of exercise trials observing the effects of physical activity on Type 2 diabetics, few studies compare the benefits of the intervention exclusive to the participants' sex.

PURPOSE: To evaluate sex-specific glycated hemoglobin (HbA1c) changes to structured exercise among males and females with Type 2 diabetes.

METHODS: 24 males and 40 females with Type 2 diabetes were enrolled in an exercise program involving aerobic activity, resistance exercise, and flexibility training. At the initial evaluation, subjects underwent a health history exam, multiple assessments of physical fitness, cardiometabolic testing, and an assessment of HbA1c. Following 10 weeks of bi-weekly exercise sessions, participants that remained active in the program were reassessed. A repeated measures ANOVA with Greenhouse-Geisser correction compared HbA1c levels at baseline and follow-up between sexes.
RESULTS: Subjects were assigned to "completers" (N=39) or "non-completers" (N=28) based on adherence to the exercise program. At baseline, HbA1c levels did not differ between completers and non-completers (p=0.234). Sex was not related to completion of the trial (p=0.660) or baseline HbA1c (p=0.117). The repeated measures ANOVA found HbA1c to improve with exercise (F=7.878, p=0.008) and an interaction effect with sex (F=6.734, p=0.014) whereby males decreased more than females (0.61 compared to 0.02).
CONCLUSION: In our sample, a structured exercise program induced greater reductions in HbA1c among male participants versus female participants. These findings help illustrate clinical importance for personalizing sex-specific exercise programs for persons at risk for or diagnosed with Type 2 diabetes.

C-08 Thematic Poster - Oxygen Uptake Kinetics

Thursday, May 30, 2019, 9:30 AM - 11:30 AM
Room: CC-102A

1151 **Chair:** John M. Kowalchuk. *University of Western Ontario, London, ON, Canada.*

(No relationships reported)

1152 Board #1 May 30 9:30 AM - 11:30 AM

Relationship Between Muscle Deoxygenation And Workload At Peak Exercise In Healthy Adults Using Near-infrared Spectroscopy

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(No relationships reported)

Near-infrared spectroscopy (NIRS) is used to investigate muscle oxygenation, but the association of muscle deoxygenation (deoxygenated hemoglobin, deoxy[Hb+Mb]; ΔHHb) to workload during exercise needs further study.
PURPOSE: To characterize the relationship between the change in muscle deoxygenation (ΔHHb) and maximal workload (MW) achieved during maximal cardiopulmonary exercise test (CPET).
METHODS: 6 men and 5 women (mean ± SD: 39.09 ± 17.2 years [age]) underwent CPET on a recumbent cycle ergometer. ΔHHb in the vastus lateralis muscle was measured using NIRS, and MW as recorded in Watts. A polynomial model (ΔHHb ~ MW + MW^^{2} + peak oxygen uptake; VO_2peak) was compared to a semi-linear regression model (with an added interaction term between VO_2peak and MW) to characterize the relationship.
RESULTS: ΔHHb during CPET was strongly correlated with peak workload (0.881, p=0.0003) and VO_2peak (0.934, p=0.0001). The polynomial model explaining the relationship was significant (Adj.R^2:0.821, F(4,7)= 7.853, p=0.009); however, the point estimates were not . The semi-linear regression model was better able to characterize the overall trend (Adj.R^2: 0.90, p=0.0002) and the drop in ΔHHb at the higher ends of MW, and indicated that VO_2peak had a significant effect (B=54.9, p=0.019), and interacted with MW (B=-0.157, p=0.04).
CONCLUSION: These preliminary results show that the linear increase in ΔHHb with incremental workload appears to attenuate and slightly decrease at greater MW, especially for those with higher exercise capacity.
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