

B-71 Free Communication/Poster - Exercise-Diabetes

Wednesday, May 30, 2018, 1:00 PM - 6:00 PM
Room: CC-Hall B

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Maintenance of Health-Related Fitness Gains Following Underwater Treadmill Training in Adults with Type 2 Diabetes

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(No relevant relationships reported)

PURPOSE: To document short- and long-term effects of a 12-week aquatic exercise walking program on components of health-related fitness in middle-aged adults with type 2 diabetes.

METHODS: Thirteen adults with type 2 diabetes (age = 59.5 ± 4.5 yrs; 7 females, 6 males) completed 12 weeks of underwater treadmill training (UTT) (3d-wk⁻¹), followed by a 12-week follow-up period that involved no UTT. Exercise intensity and duration, which were initially set to 40-50% of heart rate reserve (HRR) and 30 minutes (three 10-min bouts) were systematically and progressively increased to 50-70% HRR and 60 minutes (three 20-min bouts) by week 12. During the follow-up period, study participants maintained their current diet and were given permission to perform any type or amount of physical activity except a formalized exercise program. Primary outcome variables included cardiovascular function [resting heart rate (RHR) and 6-min walk for distance (6MWF)]; body composition [body mass (BM), body fat percentage (BF%), waist circumference (WC)]; and leg strength [hamstring and quadriceps isokinetic peak torque at 30°·sec⁻¹ and 60°·sec⁻¹]. Baseline, post-UTT, and post-follow-up scores were analyzed using 1-way repeated measures analysis of variance.

RESULTS: Compared to baseline scores, significant ($p < .05$) improvements in cardiovascular function (decreased RHR, increased 6MWD), body composition (decreased BM, BF%, and WC), and leg strength (greater peak hamstrings torque at 60°·sec⁻¹, and peak quadriceps torque at 30°·sec⁻¹), were observed after UTT. Three months following completion of UTT, positive changes in nearly all HRF variables (6MWD, BM, BF%, WC, peak hamstrings torque at 60°·sec⁻¹, peak quadriceps torque at 30°·sec⁻¹) were maintained ($p < .05$) relative to baseline values.

CONCLUSIONS: Our findings indicate that improvements in HRF resulting from 12 weeks of UTT persist three months after cessation of UTT in middle-aged adults with type 2 diabetes.

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A Bout of High-Intensity Interval Training Increases Seric Musclin in Adults with Metabolic Syndrome

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(No relevant relationships reported)

Musclin is a myokine which induces insulin resistance (IR) in vitro, also proposed to favor aerobic capacity in murine models, which seems contradictory. Because of that, and since exercise contributes to improve IR in metabolic syndrome (MS) probably by regulating myokines, it is necessary to understand exercise's role in regulating musclin in humans.

PURPOSE: to study the effect of a bout of high-intensity interval training (HIIT) on seric musclin in adults with MS and IR.

METHODS: 11 men and 4 women with MS and IR were evaluated in an experimental, pilot study. Musclin was measured by ELISA, and both glycemia and insulin by standard methods, at: 1) fasting conditions, 2) 60 minutes after a breakfast of 408 Kcal (55.1 g carbohydrates, 17.4 g fat, 9.2 g proteins), and 3) immediately after a session of HIIT (100 min after breakfast). Homeostatic model assessment (HOMA-IR) was used as indicator of IR. The HIIT session lasted 19 minutes and consisted of 5 cycles, each of them with one minute of high intensity (85% of VO₂max) and two minutes of moderate intensity (50% of VO₂max). Three minutes of warming up and cooling down at 3 MET intensity was always done. Data are presented as median (interquartile range). Comparisons were done with Friedman test.

RESULTS: patients had an age of 52 years (45-59), a body mass index (BMI) of 26.8 kg·m⁻² (24.9-30.1), oxygen consumption (VO₂max) of 34.6 ml·kg⁻¹·min⁻¹ (30.2-38.2) and HOMA-IR of 3.3 (2.6-4.3). Musclin values post-HIIT (709.6 pg·ml⁻¹ (585.2-833.9)) showed a trend to be higher than fasting (599.1 pg·ml⁻¹ (506.2-724.5), $P=0.088$) and refeeding (593.0 pg·ml⁻¹ (466.4-918.2), $P=0.061$) conditions. Fasting musclin correlated with diastolic blood pressure during the HIIT bout ($r=-0.62$, $P<0.05$). Insulin of 13.9 μU mL⁻¹ (10.4-16.6), 59.4 μU mL⁻¹ (23.1-159.8) and 30.8 μU mL⁻¹ (22.4-41.5) and glycemia of 102.4 mg dl⁻¹ (89.9-108), 111 mg dl⁻¹ (84.4-127.4) and 97.1 mg dl⁻¹ (87.3-110.3), were measured at conditions 1 to 3, respectively.

CONCLUSIONS: a bout of HIIT trend to increase circulating musclin in humans with MS and IR, which does not support the idea of a myokine that induces IR. Future experiments will test if the increase in musclin could be explained by an increase in insulin. Colciencias 111562638757. CODI 2605. Interinstitucional 2016-1341. Colciencias Doctoral scholarships 727-2015.

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Time-efficient Sprint Interval Exercise Improves 24-h Glycaemic Control In Men With Type 2 Diabetes

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(No relevant relationships reported)

PURPOSE: Reduced-exertion high-intensity interval training (REHIT) is a genuinely time-efficient exercise intervention that has been shown to improve aerobic capacity and blood pressure in men with type 2 diabetes. However, the acute effects of REHIT on 24 h glycaemic control in type 2 diabetes have not been determined.

METHODS: Eleven men with type 2 diabetes (mean ± SD: age, 52±6 years; BMI, 29.7±3.1 kg/m²; HbA_{1c}, 7.0±0.8%) participated in a randomised four-trial crossover study, with continual interstitial glucose measurements captured during a 24 h period including either: (1) no exercise (CON); (2) 30 min of continuous exercise (CE); (3) 10 x 1 min at ~90 HR_{max} (HIIT; time commitment, ~25 min); and (4) 2 x 20 s 'all-out' sprints (REHIT; time commitment, 10 min). Nutritional intake and timings of consumption were standardised within participants. The 24 h monitoring period started prior to breakfast and the exercise was performed 30 min after breakfast. Comparisons for 24 glycaemic variables were made using one-way repeated measures ANOVA and Holm-Sidak corrected t-tests for pre-planned contrasts (exercise conditions versus control). Cohens d was used as a measure of effect size with the following thresholds: small ($d = 0.2$), medium ($d = 0.5$) and large ($d = 0.8$) effect.

RESULTS: Compared with CON (8.1±1.1 mmol/l), both REHIT (7.5±0.9 mmol/l, $p<0.05$, $d=0.55$) and CE (7.7±1.1 mmol/l, $p=0.06$, $d=0.35$) lowered mean 24 h glucose, and this was largely driven by a markedly lower glycaemic response (AUC) to dinner in both instances (-11%, $p<0.05$ and $d>0.8$ for both). The prevalence of hyperglycaemia was reduced with all three exercise bouts compared with CON (REHIT: -112 min; CE: -115 min; HIIT -125 min, all $p<0.05$, all $d>0.5$), whilst measures of glycaemic variability were not significantly altered.

CONCLUSIONS: These data suggest that REHIT may offer a genuinely time-efficient alternative exercise option for improving 24 h glycaemic control in men with type 2 diabetes.