Short-term evaluation of a men sensitive weight management program: Peer4Men© a pilot study

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In Canada, higher percentages of men are overweight or obese than women. An even larger amount of obese/overweight men are found in Northern Ontario. Research confirms an under representation of men in weight management interventions, despite convincing literature identifying beneficial effects of participation in weight loss/management educational programs that are gender sensitive. Recently, Dr. Jbilou's research team has developed a clinical algorithm intended to identify, educate, evaluate, and assist men to establish a healthy lifestyle (i.e., Peer4 Men©). This approach includes a 12-week educational peer led program that was developed according to best practices identified in the scientific literature and has been adapted to the context of Greater Sudbury. In this pilot study, we sought to evaluate the short-term impact of Peer4Men© on knowledge acquisition and behaviour change (e.g., physical activity, nutrition, alcohol consumption, and stress management were evaluated by means of diagnostic, formative, and summative evaluations). Participants answered a questionnaire two weeks prior to commencing the program and again at the end of the program. The participants were also invited to participate in a follow-up focus group discussion. In January 2015, a peer educator was identified and seven additional men expressed an interest to participate. One man did not begin the program and was subsequently removed from the study. The average age of the participants was 55 years (51-59) with a mean BMI of 35.6 kg/m^2 (29.4 - 56.9). All men (n=7) completed the program and attended on average 9 sessions. Changes in health behaviours and acquisition of knowledge from the pre/post-intervention questionnaire will be presented, and the impact of the experience from the men's perspective will be discussed. Results from this pilot study will allow us to understand the program's ability to create short-term changes in health knowledge and behaviour. Furthermore, this pilot study will allow us to identify drivers and challenges for a successful implementation of the program.

Ischemic preconditioning increases muscle perfusion, oxygen uptake and maximal force

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Ischemic preconditioning (IPC) consists of repeated episodes of muscle ischemia followed by reperfusion, which can improve performance in swimming, cycling and running. However, the underlying mechanisms are still poorly understood. This study examined the effects of IPC on muscle perfusion and oxygen uptake during repeated maximal contractions. In a randomized, single blind, crossover study, ten trained men (25.3 ± 4.4 y, 1.77 ± 0.06 m, 85.8 ± 13.9 kg) performed five sets of 5 maximum voluntary knee extensions (20°/sec) of the right leg on an isokinetic dynamometer (Kin-Com 500H), preceded by either IPC of the right lower limb (three 5-min ischemia/5-min reperfusion cycles at 200 mmHg) or SHAM (three cycles at 20 mmHg). Muscle total haemoglobin ([THb]) and deoxy-Hb ([HHb]) concentrations of the vastus lateralis muscle were continuously monitored by near-infrared spectroscopy. Δ[HHb] was expressed in percentage of arterial occlusion (AO), and used as an index of skeletal muscle O2 consumption. IPC-SHAM differences were analyzed using Cohen's effect sizes (ES) ± 90% confidence limits, and magnitude-based inferences. Compared to SHAM, peak force (11.8% improvement, ES 0.37, 90% confidence limits for ES 0.27; 0.47) was almost certainly higher; average force (12.6%, ES 0.47, 0.29; 0.66) was very likely improved and muscle oxygen uptake (15.8%, ES 0.36, -0.07; 0.79) was possibly increased after IPC. IPC also increased muscle blood volume (Δ*tHb+) at rest (46.5%, ES 0.56, -0.21; 1.32) and during recovery after set one (23.6%, ES 0.30, -0.05; 0.65), four (18.2% ES 0.24, -0.71; 1.18) and five (25.1%, ES 0.32, 0.09; 0.55). In conclusion, 3 cycles of IPC immediately increased peak and average force by increasing perfusion at rest and during recovery, and muscle oxygen uptake.

Protein ingestion does not modulate skeletal muscle LAT1 protein content throughout the postprandial period in healthy young men

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Increased skeletal muscle amino acid transporter expression to food ingestion is believed to have a key role in the regulation of the postprandial muscle protein synthetic response. In particular, system L amino acid transporter expression (LAT1/solute-linked carrier (SLC)7A5), which facilitates the transport of large neutral amino acids such as phenylalanine, tyrosine, and leucine into skeletal muscle tissue via an exchange mechanism, has been shown to be increased in response to elevated plasma essential amino acid availability and relates to the activation of anabolic signaling molecules *in vivo* in humans. Therefore, we aimed to determine the impact of protein ingestion on changes in skeletal muscle LAT1 protein content in a time-dependent manner during the postprandial period in healthy young men. Seven healthy young men (24±1 y; BMI=25±1 kg/m^2) received biopsies of the *vastus lateralis* before and after the ingestion of 38 g milk protein at 1, 2, 3, and 5 h of the postprandial period. Protein ingestion increased plasma leucine, phenylalanine, and tyrosine concentrations above baseline during the postprandial period (time effect: $P<0.001$). However, protein ingestion did not modulate the amount of LAT1 at 40 kDa (non-glycosylated) or 55 kDa (glycosylated) or the ratio of non-glycosylated to glycosylated LAT1 protein (40/55 kDa) in skeletal muscle tissue at any time point during the postprandial phase (all $P>0.05$). We conclude that protein ingestion does not modulate skeletal muscle LAT1 protein content during the postprandial period in healthy young men.

Using bilateral and unilateral exercise to better understand the blood pressure lowering effects of isometric handgrip training: preliminary findings

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Isometric handgrip (IHG) training reduces resting blood pressure (BP) in normotensive individuals following 8-10 weeks of unilateral (4 × 2 minute sustained contractions at 30% maximal voluntary contraction (MVC) performed by the non-dominant limb, separated by 4 minutes rest) or bilateral IHG training (contractions alternating between dominant and non-dominant limb, separated by 1 minute rest), performed 3-5 times per week. Investigating the effects of a single bout of unilateral or bilateral IHG on vascular function (brachial artery flow-mediated dilation (FMD) and low-flow mediated constriction (L-FMC)) may provide insight into the underlying hypotensive mechanisms of IHG training. Eight young adult (25.3 ± 3.81 years), normotensive (99.65/61.25 ± 11.72/9.14 mmHg) women performed a single bout of bilateral (n=4) or unilateral (n=4) IHG exercise. FMD and L-FMC were assessed using ultrasound pre- and post-IHG bout. Following a single IHG bout, no significant changes were observed in FMD (unilateral: pre- = 13.56 ± 7.8%, post- =17.26 ± 21%, bilateral: pre- = 17.11 ± 1.1%, post- = 21.18 ± 8.9%) or L-FMC (unilateral: pre- = 3.36 ± 11%, post- = –2.26 ± 16%, bilateral: pre- = -2.86 ± 3.1%, post- = -1.94 ± 9.7%) in either group (all

$p > 0.05$). Taken together these preliminary data suggest that in young healthy women, irrespective of isometric exercise on 1 or 2 limbs, the endothelium is not altered significantly. Further research with a larger sample is warranted to confirm that mechanisms other than improved vascular function play a role in IHG-training induced BP lowering.

Older females have a reduced heat loss capacity in dry but not humid heat stress conditions

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Recent studies demonstrate that older females have a reduced capacity to dissipate heat during physical work compared to their younger counterparts. However, the extent to which these age-related impairments hold true in conditions that restrict evaporative cooling remains unclear. Therefore, the purpose of this study was to assess how aging influences heat dissipation during exercise performed in the heat (35 °C) under dry (20%) and humid (60%) conditions. Nine young (Y, 25±4 years) and eight older (O, 51±8 years) physically active females matched for body surface area (Y: 1.68±0.11 m^2; O: 1.76±0.15 m^2, p=0.232) and maximal oxygen uptake (Y: 39.2±4.5; O: 35.2±6.8 ml/kg/min, p=0.168) performed four 15-min bouts of cycling at 300 W of metabolic heat production separated by 15-min recovery periods in a semi-nude state in both dry and humid conditions. Whole-body evaporative heat loss (H_E) and metabolic heat production were measured by direct and indirect calorimetry, respectively. Body heat storage was calculated as the temporal summation of heat production and heat loss. No group differences (p=0.335) in H_E were observedin the dry condition during exercise (Y: 252±14; O: 235±26 W) and recovery (Y: 116±6; O: 123±12 W). Similarly, there were no group differences (P=0.774) in H_E during exercise (Y: 204±15; O: 195±18 W) and recovery (Y: 88±10; O: 91±8 W) in the humid condition. However, for both groups H_E was reduced during exercise and recovery in the humid compared to the dry condition (all p≤0.05). As a result of the attenuated H_E in the humid condition, young and older females stored 54% and 37% more heat relative to the dry condition (Y: 184±47; O: 279±73 kJ, both p≤0.05), respectively. Furthermore, the cumulative amount of heat stored over the 2-hour exercise protocol was significantly greater for the older females (p=0.006) in the dry condition compared to their younger counterparts. However, the amount of heat stored during the humid condition was similar between groups (Y: 395±44; O: 442±58 kJ, p=0.078). We conclude that elevated ambient humidity impeded heat dissipation to a similar extent in young and older females; however, the older females did experience a greater thermal strain in comparison to their younger counterparts when exercise in the heat was performed in relatively dry ambient conditions. (Funding support: Workplace Safety and Insurance Board (Ontario).)

Left out in the cold: Maintaining eccentric muscle function in older adults

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Older adults better maintain eccentric strength relative to isometric, indicated by a higher ratio of eccentric:isometric (ECC:ISO) force as compared with younger adults. This maintenance of ECC:ISO is also consistent across a wide range of angular velocities. Suggested mechanisms include an increase in passive force from non-contractile tissue contributing to force during stretch and an active cross-bridge based mechanism. To test cross-bridge based force production, and to further elucidate the role of cross-bridge mechanics on the age-related maintenance of ECC:ISO, temperature changes can be imposed to bias the proportion of cross-bridges to a weakly(cold) or strongly(warm) bound configuration. The purpose here was to investigate electrically evoked force (80 Hz; ulnar nerve) of the adductor pollicis during lengthening contractions in 12 young(~24 y) and 10 older(~72 y) healthy active men across temperature (Cold; ~19 °C, Normal; ~30 °C, Warm; ~35 °C). Prior to lengthening, the muscle was pre-activated at 50-60% maximal isometric voluntary strength, then lengthened (20-320 o/s). Old were 20-30% weaker in the normal and cold conditions (P<0.05) with no difference for the warm as compared with young (P>0.05). 80Hz half relaxation time (HRT) was not different across age for the normal and warm temperature conditions (P>0.05) but was slowed significantly for old in the cold condition compared with young (~20%; P<0.05). There was no difference in ECC:ISO across age for normal and warm conditions (P>0.05), however there was a 50-60% increase for the cold compared with both the normal and warm condition. Additionally, there was an effect of age in the cold condition, with old showing a ~20-35% higher ECC:ISO across velocities above 80o/s compared with young (P<0.05). Despite similar contractile speeds in young and old at baseline, the slowing in the cold condition and elevated ECC:ISO highlights the relationship between slowed contractile properties and eccentric strength (r=0.66). The higher ECC:ISO in the cold condition is most likely owing to a greater proportion of weakly bound cross-bridges not contributing to isometric force but contributing to force during lengthening. The unique high Type I fibre type composition of the adductor pollicis may have contributed to the lack of age-related differences in the normal and warm conditions. (Funding: NSERC, CIHR, AIHS & Killam Trusts.)

Heart rate recovery following 12 weeks of either traditional endurance or sprint interval training in sedentary men

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Heart rate recovery (HRR) is the decline in heart rate that occurs after exercise and is reflective of autonomic control of the heart. A slower HRR (12 beats/min or less) at 1 min post-exercise is associated with an increased risk of cardiovascular disease and all-cause mortality. While some exercise training programs have demonstrated improved HRR in clinical populations, the effect of training on HRR in healthy populations is currently unclear. Nineteen sedentary, but otherwise healthy, men (aged 28±8 years) underwent 12 weeks of either traditional endurance training (END) or sprint interval training (SIT) 3 times/week on a cycle ergometer. The END protocol consisted of 45 min of continuous cycling at ~70% maximal heart rate, and the SIT protocol consisted of 3x20 sec sprints against 5.0% of body weight interspersed with 2 min of active recovery. Both protocols included a 2 min warm-up and 3 min cool-down. HRR at 1 and 2 min post-exercise was calculated by subtracting heart rate at 1 and 2 min post-exercise from the maximal heart rate attained during exercise. For each group, HRR at 1 and 2 min was assessed at baseline, 6 weeks, and 12 weeks of training and analyzed with one-way repeated measures ANOVAs. Following 12 weeks of training, HRR at 1 min was unchanged in both the END (baseline: 38±13 beats/min; 6 weeks: 45±9 beats/min; 12 weeks: 43±13 beats/min; p=0.37) and SIT groups (baseline: 29±8 beats/min; 6 weeks: 27±9 beats/min; 12 weeks: 25±10 beats/min; p=0.58). HRR at 2 min was also unchanged in the END group (baseline: 48±13 beats/min; 6 weeks: 50±10 beats/min; 12 weeks: 51±11 beats/min; p=0.93), but decreased following the 12 weeks of training in the SIT group (baseline: 50±11 beats/min; 6 weeks: 44±13 beats/min; 12 weeks: 41±9 beats/min; p=0.03). Furthermore, all participants exceeded the clinical 12 beats/min HRR cut-off at all time points. It appears that improvements in HRR may be more likely to occur following exercise training in populations