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### Moderated Poster Abstract Presentations

Session Title: Physical Activity/Fitness

## Abstract MP016: Innovation in Exercise: Increasing Capacity of Sedentary Obese Women with Cooling

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**Background:** Barriers to physical activity for obese women include overheating, sweating, fatigue, exhaustion, and rapid heart rate. Adipose tissue acts as a thermal insulator, promoting a greater heat load on the nonfat tissues, reducing heat tolerance; exercise causes a rise in body temperature with an inability to dissipate heat contributing to reduced exercise tolerance. With difficulties of thermoregulation in the sedentary obese population, the aspect of attenuating the discomfort thus associated may encourage continuation of exercise. A heat sink applied to palmar surfaces extracts heat and cools the venous blood, reducing thermal strain by enhancing the volume of cooled venous return. We hypothesized that palmar cooling using a rapid thermal exchange device (RTX) during exercise would attenuate the thermal discomfort of exercise of sedentary obese women, improving exercise tolerance.

**Methods:** To examine whether palmar cooling would impact exercise tolerance in obese women, 24 healthy women aged 30–45 years, with no history of long term structured exercise, a body mass of 120–135% above ideal and/or BMI between 30 and 34.9 were recruited. Women were randomized into a cooling (RXT with 16°C water circulating) or a control (RTX with 37°C water circulating) group and attended 3 exercise sessions a week for 3–months (12 weeks). Each session was comprised of 10 min body weight exercises, 25–45 min treadmill walking at 70–85% HRR with the RTX device, and 10 min of core strengthening exercises. The performance marker was a 1.5 mi walk for time; conducted on the first and last days of the intervention. Mixed models were used to model each of the outcomes as a function of thermal strain, time and treatment with covariates of speed, heart rate, distance, and the interaction of the main effects included in the model.

**Results:** Groups were matched at baseline for key variables (time for 1.5 mile walk test, resting and exercising heart rate [HR], blood pressure [BP], waist circumference [WC], body weight, body mass index [BMI]). Among the cooling group, time to complete the 1.5 mile walk test was significantly faster ( $31.6 \pm 2.3$  vs.  $24.6 \pm 2.5$  min, pre vs. post,  $P < 0.01$ ). A greater average exercising HR was observed ( $136$  vs.  $154$  bpm, pre vs. post,  $P < 0.001$ ), with a significant reduction in WC ( $41.8 \pm 3.1$  vs.  $39.1 \pm 2.2$  inches, pre vs. post,  $P < 0.01$ ) and resting BP ( $139/84 \pm 124/70$  mmHg, pre vs. post,  $P < 0.025$ ). There were no significant differences observed in the control group.

**Conclusion:** Results indicate that exercise tolerance in obese women improved with cooling during exercise, more so than those women who did not have cooling. An improvement in blood pressure, heart rate, waist circumference, and overall aerobic fitness was observed. These findings suggest that by reducing thermal discomfort during exercise, tolerance increases, thus improving cardiovascular parameters of obese women.

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