

## Concurrent Session 12: Interventions in Obesity

### Effect of energy-restriction and exercise on body composition, cardiovascular risk profile and reproductive function in overweight and obese women with polycystic ovary syndrome

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**Background** – The benefits of exercise in combination with energy-restriction (ER) for enhancing the management of polycystic ovary syndrome (PCOS) has not been extensively studied.

**Objective** – To evaluate the effects of exercise when combined with ER (~6000 kJ/d) on body composition, cardiovascular risk factors and reproductive function in overweight/obese PCOS women.

**Design** – Ninety-four overweight/obese women with PCOS (age 29.3±0.7 yr; BMI 36.1±0.5 kg/m<sup>2</sup>) were randomised to one of three 20 week interventions: Diet only (DO; n=30), diet and aerobic exercise (DA; n=31, 5 walking sessions/wk) and diet and combined aerobic-resistance exercise (DC; n=33, 3 walking and 2 strength sessions/wk). Weight, body composition, blood pressure (BP), lipids, glucose, insulin, insulin resistance (calculated by HOMA2), testosterone, sex-hormone binding globulin (SHBG), free androgen index (FAI) and reproductive function (menstrual cyclicality and ovulation) were assessed.

**Outcomes** – Weight loss was similar between groups (DO 8.9±1.6%, DA 10.6±1.7%, DC 8.7±1.7%; P<0.001 for time; P =0.7 time x treatment). DA and DC had a 45% greater reduction in fat mass (P<0.01) and 60% lesser reduction in fat free mass (P<0.03) than DO. BP (-5.6/2.7 mmHg), triglycerides (-0.4 mmol/L), total cholesterol (-0.5 mmol/L), glucose (-0.2 mmol/L), insulin (-4.3 mIU/L), HOMA2 (-0.6) testosterone (-0.4 nmol/L), SHBG (7.0 nmol/L), FAI (-2.8) and reproductive function improved (P<0.001), with no difference between treatments.

**Conclusion** – In overweight and obese women with PCOS, the addition of exercise to ER improved body composition but had no added effect on cardiovascular risk factors or reproductive outcomes.

### Sympathetic neural adaptation to hypocaloric diet and aerobic exercise in metabolic syndrome subjects

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**Background** – Metabolic syndrome (MetS) obesity is associated with increased sympathetic nervous system (SNS) activity which occurs even in the absence of hypertension.

**Objectives** – To determine whether dietary weight loss in combination with aerobic exercise (WL+EX) is more beneficial than weight loss alone (WL) in reducing SNS activity and improving MetS parameters.

**Design** – Fifty nine (35M, 24F; mean age 55 ± 1 yrs; BMI 32.3 ± 0.5 kg/m<sup>2</sup>) non-smoking, untreated subjects who fulfilled ATP III criteria were randomly allocated to one of three groups: (1) WL (2) WL+EX or (3) no treatment (Control). EX comprised 40 min bicycle riding on alternate days at 65% maximal heart rate. A modified DASH diet (22% protein, 30% fat, 48% CHO) was used as background diet. Measurements of resting muscle sympathetic nerve activity (MSNA) by microneurography, whole-body norepinephrine (NE) spillover rate, fitness (maximal oxygen consumption), MetS parameters and body composition by DEXA were made at baseline and at 12 weeks.

**Outcomes and Conclusion** – Body weight decreased by 7.1 ± 0.7 and 8.3 ± 1.1 kg in the WL and WL+EX groups respectively (both P<0.001), however the WL group lost significant lean mass (1.9 ± 0.3 kg, P<0.001), whereas the WL+EX group did not. Fitness increased by 18 ± 3% (P<0.001) in the WL+EX group only. MSNA decreased by 10 ± 3 and 13 ± 3 bursts/min (both P<0.001) and NE spillover by 94 ± 33 and 103 ± 39 ng/min (both P <0.01) in the WL and WL+EX groups, respectively but did not change in the Control group. Blood pressure and metabolic parameters improved similarly in the two lifestyle intervention groups. The findings of this study indicate that addition of exercise to a weight loss program does not confer additional benefits on SNS activity. This suggests that weight loss is the prime mover in sympathetic neural adaptation to a hypocaloric diet.