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Long-term lifestyle intervention and optimized high intensity interval training program improve body composition, cardiovascular risk and exercise capacity in obese patients with or without metabolic syndrome

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**Keywords:** Metabolic syndrome; Exercise; Interval training; Ventricular repolarisation; Arrhythmia

**Purpose:** To study long-term effects of lifestyle intervention and exercise program including optimized high-intensity interval exercise training (HIIT) and resistance training performed 2 to 3 times/week, on body composition, cardiometabolic risk factors, exercise capacity and exercise tolerance in obese subjects with or without metabolic syndrome.

**Methods:** Sixty-two obese subjects (53.3 ± 9.7 years, BMI: 35.8 ± 5 kg/m²), 37 of whom with metabolic syndrome (MetS), were retrospectively identified at their entry into the program. Anthropometric measurements, cardiometabolic risk factors, Framingham scores and exercise capacity were measured at baseline and after 9 months of program.

**Results:** No adverse events were noted during HIIT training. Weekly energy expenditure was in line with recommendations (1582 ± 284 kcal). Significant and clinically relevant improvements were found for body mass (−5.3 ± 2.5 kg, P < 0.0001), BMI (−1.9 ± 1.9 kg.m⁻², P < 0.0001), waist circumference (−5.8 ± 5.4 cm, P < 0.0001) and maximal exercise capacity (+1.26 ± 0.84 METs, P < 0.0001). Total fat mass and trunk fat mass (P < 0.0001), lipid profile, insulin sensitivity (P < 0.0001) and Framingham scores (P < 0.05) were also significantly improved. At the end of the program, 32.5% of MetS subjects no longer possessed MetS diagnostic criteria (P < 0.05). Independent predictor of being a responder to body mass and waist circumference (WC) decrease were baseline BMI and resting metabolic rate, as well as smoking status for WC, and baseline WC and triglycerides/HDL-cholesterol ratio for BMI decrease.

**Conclusion:** Long-term lifestyle intervention associated with optimized HIIT improve body composition, cardiometabolic risk factors, cardiovascular risk, MetS prevalence and exercise tolerance in obese subjects. This intervention appeared safe, efficient, well tolerated and could improve adherence to exercise training programs in this population.

**References**


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High-intensity interval training program improves body composition, exercise capacity and metabolic profile better than moderate-intensity continuous exercise in MetS patients with similar effects on ventricular repolarisation parameters

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**Purpose:** To compare the long-term effects of two different modes of exercise training (moderate intensity continuous exercise [MICE] vs. high-intensity interval training [HIIT]) on QT dispersion (QTd) parameters (a marker of myocardial electrical instability), cardiovascular risk factors, and exercise capacity in patients with metabolic syndrome (MetS).

**Methods:** Sixty-five MetS patients (mean age: 53 ± 9 years) were assigned to either a MICE (30 minutes at an intensity corresponding to 60% of peak power output, n = 30) or a HIIT exercise prescription (two sets of 10 minutes of repeated bouts of 15 and/or 30 sec at 80% of peak power output interspersed by 15 and/or 30 sec phases of passive recovery, n = 35) on a cyclogrameter. Exercise training was performed 3 times/week during 9 months. Ventricular repolarization parameters (QT dispersion = QTd, standard deviation of QT = SDQT, relative dispersion of QT = RDQT, QT corrected dispersion = QTcd), cardiometabolic risk factors, anthropometric data and maximal exercise capacity were assessed at baseline and after the 9 months training period.

**Results:** No adverse events were noted during HIIT training. QTd decreased significantly in both groups (QTd pre vs. post = 50 vs. 44 ms in MICE group, P < 0.0001; 28 vs. 34 ms in HIIT group, P < 0.01). Other ventricular repolarization parameters also improved significantly in both groups. Exercise capacity significantly increased (+0.9 and +1.2 METs (P < 0.0001) in MICE and HIIT group, respectively), as well as lipid profile. Changes in QTd were correlated with changes in METs (r = -0.21, P < 0.03), triglycerides level (r = 0.27, P < 0.02) and triglycerides/HDL-cholesterol ratio (r = 0.21, P < 0.03) for HIIT group only. No