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Varied Walking Dose In Women With Type 2 Diabetes: Heart Rate Variability And Hemorheology Responses: 2739: Board #38 June 3 2:00 PM - 3:30 PM

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Type 2 diabetes accelerates and exacerbates the age-related decline in heart rate variability (HRV) and impairment of hemorheology. While exercise training is one of the cornerstone therapies for managing type 2 diabetes, little is known about the optimum dose of exercise training for the improvement of HRV and/or hemorheology.

PURPOSE: To investigate HRV and hemorheology adaptations to 12 wk of varied-dose treadmill walking in women aged 65-74 yr with type 2 diabetes.

METHODS: Fifteen subjects with uncomplicated type 2 diabetes (Age: 69 ± 2 yr; BMI: 30 ± 5 kg·m⁻²; VO₂peak: 20.3 ± 3.1 ml·kg⁻¹·min⁻¹) were randomly allocated into two exercise training groups (Group 1: 2×60 min·wk⁻¹ or Group 2: 4×30 min·wk⁻¹). The exercise program was 12 wk and the exercise intensity was set and adjusted every 6 wk to equal 100% of each individual's gas-exchange threshold. Time domain indices of HRV included i. the standard deviation of RR intervals (SDNN) ii. the square root of the mean of squared differences between successive intervals (RMSSD). Frequency domain indices of HRV included: log-transformed low and high frequency (lnLF and lnHF, respectively) power. Red blood cell (RBC) aggregation was measured in plasma and a standard aggregating solution (3% dextran 70 kDa), and RBC deformability was determined via ektacytometry. Dependent variables were measured before (wk -6 and 0), during (wk 6) and after (wk 12) the walking program.

RESULTS: Twelve weeks of exercise training significantly improved VO₂peak, time to exhaustion, and the gas-exchange threshold ($p < 0.05$), independent of exercise group. While exercise training did not improve glycemic control, high-density lipoprotein concentration increased by 7.5% for both groups ($p = 0.01$). Exercise training reduced RBC aggregation in plasma by -6.6% and in dextran-70 by -12.2% ($p < 0.05$), and improved RBC deformability by 3.4% ($p < 0.05$) for both groups. No change in HRV was observed for Group 1, whereas SDNN, RMSSD and lnHF power were improved in Group 2 ($p < 0.05$).

CONCLUSIONS: These results suggest that the accumulated weekly exercise duration may be the most important training component for the prescription of exercise in older women with type 2 diabetes. Exercise frequency should be considered, however, when prescribing exercise to improve HRV.

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