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Effects of exercise modality on insulin resistance and functional limitation in older adults: a randomized controlled trial.

Davidson LE, **Hudson R**, **Kilpatrick K**, **Kuk JL**, **McMillan K**, **Janiszewski PM**, **Lee S**, **Lam M**, **Ross R**.

School of Kinesiology and Health Studies, Queen's University, Kingston, ON K7L 3N6, Canada.

BACKGROUND: Authorities advocate that resistance and aerobic exercise are essential for reducing risk factors for chronic disease and disability in older adults. However, the incremental effects of combined resistance and aerobic exercise compared with either modality alone on risk factors for disease and disability is generally unknown. METHODS: Participants were 136 sedentary, abdominally obese older men and women recruited from September 30, 2002, through November 15, 2006, at Queen's University. Participants were randomized to 1 of the following 4 groups for 6 months: resistance exercise, aerobic exercise, resistance and aerobic exercise (combined exercise), or nonexercise control. Primary outcomes were analyzed by an intent-to-treat model and included changes in insulin resistance by hyperinsulinemic-euglycemic clamp and functional limitation using the average change in 4 tests combined (average z score). RESULTS: After controlling for age, sex, and baseline value, insulin resistance improved compared with controls in the aerobic exercise and the combined exercise groups but not in the resistance exercise group. Improvement (mean [SE]) in the combined exercise group was greater than in the resistance exercise group (9.2 [1.3] vs 1.8 [1.3] mg/mL/microIU per kilogram of skeletal muscle per minute x100 [P < .001]) but not in the aerobic exercise group (9.2 [1.3] vs 6.5 [1.3] mg/mL/microIU per kilogram of skeletal muscle per minute x100 [P = .46]). Functional limitation improved significantly in all groups compared with the control group. Improvement in the combined exercise group was greater than in the aerobic exercise group (0.5 [0.1] vs -0.0 [0.1]; standard units, z score [P = .003]) but not in the resistance exercise group. Improvement in the resistance exercise group was not different from the aerobic exercise group. CONCLUSION: The combination of resistance and aerobic exercise was the optimal exercise strategy for simultaneous reduction in insulin resistance and functional limitation in previously sedentary, abdominally obese older adults. TRIAL REGISTRATION: clinicaltrials.gov Identifier: NCT00520858.