Aerobic Plus Resistance Exercise Lowers HbA_{1c}

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Combined aerobic and resistance exercise training lowered hemoglobin A_{1c} levels modestly in patients with type 2 diabetes, while either type of training alone did not, according to a recent report.

Patients who participated in the combined exercise also were able to decrease their hypoglycemic medication more often than were those who participated in either type of exercise alone, said Dr. Timothy S. Church of Pennington Biomedical Research Center at Louisiana State University, Baton Rouge, and his associates.

The investigators assessed outcomes in 262 sedentary adults (mean age 56 years) with type 2 diabetes during a 9-month exercise intervention in which no attempt was made to alter patients' diets, medication usage, or other lifestyle factors. The study subjects were randomly assigned to undergo aerobic training only (72 patients), resistance training only (73 patients), a combination of both (76 patients), or no exercise training (41 patients serving as a control group).

The interventions were specifically designed so that all study subjects would spend the same amount of time exercising – approximately 140 minutes per week. This ensured that any differences between the combined-exercise group and the other exercise groups could be attributed to the activity itself, rather than to an extended time spent exercising in the combination group.

All the interventions took place in a laboratory facility and were closely supervised. In addition, study subjects had monthly visits with a certified diabetes educator who reviewed fasting glucose

records and measured weight and HbA_{1c} levels from finger-prick blood samples.

The study population was ethnically diverse (44% African American) and included a high proportion of women (63%). The mean duration of diabetes was 7 years and the mean BMI was 34.9; 97% of the subjects were taking diabetes medications, including 18% on insulin.

Compared with the control group, the combination exercise group showed an absolute decrease in HbA_{1c} levels of 0.34%. Patients who performed resistance training only showed a 0.16% decrease and those who performed aerobic training only showed a 0.24% decrease, neither of which was statistically significant.

"An absolute decrease of 1% in HbA_{1c} levels has been associated with a 15%-20% decrease in major cardiovascular disease events and 37% decrease in microvascular complications. Thus, our observed reduction [of 0.3%-0.4%] might be expected to produce a 5%-7% reduction in cardiovascular disease risk and a 12% reduction in microvascular complications," Dr. Church and his associates said (JAMA 2010;304:2253-62).

In a subgroup analysis confined only to subjects whose baseline HbA_{1c} levels were 7% or higher, both the combination exercise group and the aerobic exercise group showed significant reductions in HbA_{1c}, compared with the control group. In this subgroup of patients, such reductions could be expected to reduce cardiovascular disease events by 7%-10% and microvascular complications by 18%, they added.

All three intervention groups showed modest decreases in weight circumference, which were similar across the groups. Patients who did both aerobic and resistance training showed the largest decreases in diabetes medications.

"To our knowledge, this is the first large randomized trial involving individuals with type 2 diabetes to directly test exercise prescriptions that are consistent with the 2008 Physical Activity Guidelines of 500-1000 MET (metabolic equivalent tasks)-minutes per week combined with resistance training," the investigators noted.

This study was supported by the National Institutes of Health. Dr. Church and his associates reported numerous ties to scientific, educational, and lay groups, as well as to makers of pharmaceuticals and medical devices. ■