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NEWS

RSNA Press Release

Exercise Benefits Patients with Type 2 Diabetes

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At A Glance

- Exercise can reduce fat stored in or around vital organs of people with type 2 diabetes.
- Researchers assessed the effects of exercise alone, without other lifestyle or diet changes.
- The World Health Organization projects type 2 diabetes will be the seventh leading cause of death worldwide by 2030.

OAK BROOK, Ill. — Moderate-intensity exercise reduces fat stored around the heart, in the liver and in the abdomen of people with type 2 diabetes mellitus, even in the absence of any changes in diet, according to a new study published online in the journal *Radiology*.

Type 2 diabetes occurs when the body does not produce enough insulin, a hormone that regulates the movement of sugar into the cells, or when the cells resist the effects of insulin. The disease can lead to a wide range of complications, including damage to the eyes and kidneys and hardening of the arteries.

Exercise is recommended for people with diabetes, but its effects on different fat deposits in the body are unclear, according to the study's senior author, Hildo J. Lamb, M.D., Ph.D., from the Department of Radiology at Leiden University Medical Center in the Netherlands.

"Based on previous studies, we noticed that different fat deposits in the body show a differential response to dietary or medical intervention," he said. "Metabolic and other effects of exercise are hard to investigate, because usually an exercise program is accompanied by changes in lifestyle and diet."

Hildo J. Lamb, M.D., Ph.D.

For the new study, Dr. Lamb and colleagues assessed the effects of exercise on organ-specific fat accumulation and cardiac function in type 2 diabetes patients, independent of any other lifestyle or dietary changes. The 12 patients, average age 46 years, underwent MRI examinations before and after six months of moderate-intensity exercise totaling between 3.5 and six hours per week and featuring two endurance and two resistance training sessions. The exercise cycle culminated with a 12-day trekking expedition.

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MRI results showed that, although cardiac function was not affected, the exercise program led to a significant decrease in fat volume in the abdomen, liver and around the heart, all of which have been previously shown to be associated with increased cardiovascular risk.

"In the present study we observed that the second layer of fat around the heart, the peracardial fat, behaved similarly in response to exercise training as intra-abdominal, or visceral fat," Dr. Lamb said. "The fat content in the liver also decreased substantially after exercise."

Dr. Lamb noted that the exercise-induced fat reductions in the liver are of particular importance to people with type 2 diabetes, many of whom are overweight or obese.

"The liver plays a central role in regulating total body fat distribution," he said. "Therefore, reduction of liver fat content and visceral fat volume by physical exercise are very important to reverse the adverse effects of lipid accumulation elsewhere, such as the heart and arterial vessel wall."

The findings point to an important role for imaging in identifying appropriate treatment for patients with type 2 diabetes, which the World Health Organization projects to be the seventh leading cause of death worldwide by 2030.

"In the future, we hope to be able to use advanced imaging techniques to predict in individual patients which therapeutic strategy is most effective: diet, medication, exercise, surgery or certain combinations," Dr. Lamb said.

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"Exercise and Type 2 Diabetes Mellitus: Changes in Tissue-Specific Fat Distribution and Cardiac Function." Collaborating with Dr. Lamb were Jacqueline T. Jonker, M.D., Pieter de Mol, M.D., Suzanna T. de Vries, M.D., Ralph L.Widya, M.D., Sebastiaan Hammer, M.D., Ph.D., Linda D. van Schinkel, M.D., Rutger W. van der Meer, M.D., Ph.D., Rijk O.B. Gans, M.D., Ph.D., Andrew G. Webb, Ph.D., Hermien E. Kan, Ph.D., Eelco J.P. de Koning, M.D., Ph.D., and Henk J.G. Bilo, M.D., Ph.D.

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