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Short, high-intensity exercise sessions improve insulin production in type 2 diabetes

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A new study finds that short, functional-movement and resistance training workouts, called functional high-intensity training (F-HIT), may improve beta-cell function in adults with type 2 diabetes. Beta cells in the pancreas produce, store and secrete insulin, which allows your body to use sugar for energy. The small study is the first one of its kind to analyze beta-cell function in F-HIT or resistance training. The article is published ahead of print in the *American Journal of Physiology—Endocrinology and Metabolism*.

Previous research has shown that aerobic exercise—physical activity that raises heart rate—leads to improvements in beta-cell function and insulin secretion. F-HIT workouts combine functional movements such as gymnastics, weight lifting and aerobic exercise. "Adults with [type 2 diabetes] may find it difficult to adhere to a strict exercise regimen, citing 'lack of time' as one of the primary barriers. F-HIT programs like CrossFitTM may address this barrier by providing structure, supervision and accountability, with a minimal time commitment," a group of Ohio researchers wrote.

Twelve adults with type 2 diabetes (average age: 53) participated in six weeks of an F-HIT program developed and conducted by a certified CrossFit trainer. The volunteers attended three training sessions each week. Activities varied weekly and included one high-intensity session in which the participants exercised until they hit greater than 85 percent of their maximum target heart rate.

The researchers gave volunteers an oral glucose tolerance test (OGTT) before and after the six-week exercise trial. OGTT can be used as a measure of beta-cell function. The research team took body fat and mass measurements before and after the F-HIT program as well. The CrossFit trainer recorded the number of repetitions of sit-ups, squats and rowing each volunteer completed on the second and last days of the exercise program to track exercise capacity and overall fitness.

The short-term F-HIT regimen showed significant increases in beta-cell and liver function and exercise capacity. The volunteers also lost weight and body fat percentage through F-HIT exercise. These factors can improve insulin sensitivity and blood glucose levels. "Here we show that exercise at high intensity for as little as 10 to 20 minutes per day, three days a week for six weeks improves beta-cell function in adults with [type 2 diabetes]," the researchers wrote.

More information: Stephan Nieuwoudt et al. Functional High Intensity Training Improves Pancreatic β-cell Function in Adults with Type 2 Diabetes, *American Journal of Physiology - Endocrinology And Metabolism* (2017). DOI: 10.1152/ajpendo.00407.2016

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