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Interval exercise training improves blood vessel function in older adults

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Resistance-based interval exercise helps improve endothelial function—including blood flow and blood vessel dilation—both in older adults with type 2 diabetes and in age-matched non-exercisers and regular exercisers, according to new research published in the *American Journal of Physiology—Heart and Circulatory Physiology*. The results suggest that increasingly popular interval exercise plans could be used to treat endothelial dysfunction in older adults.

"The endothelium plays a pivotal role regulating the many factors that determine vascular tone, tissue perfusion, coagulation and inflammation. Endothelial dysfunction is an early manifestation in many chronic diseases, including diabetes, and contributes to the [approximately two- to four-fold] greater risk of cardiovascular disease in type 2 diabetes," the researchers wrote. For the estimated 28 million people with type 2 diabetes in the U.S., endothelial problems can impair blood flow and lead to nerve damage and other complications.

Interval training alternates periods of high- and low-intensity exercise. Many people find interval training appealing because of the relatively short time commitment required and because rest periods are built into the exercise time. In this study, researchers compared resistance (using weighted leg resistance exercises) and cardiovascular (using a stationary bicycle) interval training to see how the exercise regimens affected endothelial function. Thirty-five volunteers (average age 56) were assigned to three groups: people with type 2 diabetes (T2D), non-exercisers without diabetes (UN-NG) and regular exercisers without

diabetes (TR-NG). Each group performed the same 20-minute exercise regimen: three-minute warm up; seven one-minute (resistance or cardio) interval workout with a one-minute rest between each interval; three-minute cool down. The researchers measured blood flow in the brachial artery in the upper arm before and immediately following interval training and at one and two hours post-exercise.

The researchers found that all of the exercisers—with or without diabetes, trained or untrained—saw an improvement of flow-mediated dilation (FMD%, a measure of endothelial function) after resistance-based interval training. This was especially true in the T2D group, which experienced FMD% improvement at each measurement period. Cardiovascular interval training led to FMD% changes after one hour in the T2D group and after two hours in the regular exercise group but did not cause any improvement in the non-exercising group.

"This study shows that resistance-based interval exercise is a time-efficient and effective exercise method to acutely improve endothelial function in T2D, age-matched UN-NG and TR-NG participants," the researchers wrote. "These findings warrant the examination of the long-term impact of [resistance-based interval exercise] on vascular function."

The article "Resistance-Based Interval Exercise Acutely Improves Endothelial Function in Type 2 Diabetes" is published ahead of print in the *American Journal of Physiology—Heart and Circulatory Physiology*.

More information: Monique Emily Francois et al. Resistance-Based Interval Exercise Acutely Improves Endothelial Function In Type 2 Diabetes, *American Journal of Physiology - Heart and Circulatory Physiology* (2016). DOI: 10.1152/ajpheart.00398.2016