Structured exercise program, not testosterone therapy improved men's artery health

February 22 2021

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Twelve weeks of exercise training improved artery health and function in middle-aged and older men (ages 50-70 years) with low-to-normal testosterone levels, while testosterone therapy provided no benefits to the

arteries, according to new research published today in *Hypertension*, an American Heart Association journal.

The natural aging process for men includes decreased testosterone and physical activity levels decline with age, leading to declines in artery health and function. Testosterone replacement therapy is often used to combat the symptoms of decreasing testosterone levels, including low energy, reduced muscle mass and reduced vigor. In the absence of any new clinical indications, testosterone sales have increased 12-fold globally in the past decades.

"The global increase in testosterone use has been very large, particularly among middle-aged and older men who might see it as a restorative hormone to increase energy and vitality," said study author Daniel J. Green, Ph.D., Winthrop Professor and cardiovascular exercise physiology researcher in the School of Human Sciences at The University of Western Australia in Perth, Australia. "However, previous studies are mixed as to whether replacement testosterone is beneficial or not, or whether it provides additional benefit over and above the effects of an exercise program."

Green and colleagues evaluated men ages 50 to 70 years old, with no history of cardiovascular disease, higher than normal waist circumferences and testosterone levels that were in the low to normal range. The researchers also excluded current smokers, men currently on testosterone treatment or men on medications that would alter testosterone concentrations. At the beginning and end of the study, researchers measured artery function using a method that increases blood flow inside an artery. This assesses whether the inner lining of the artery is healthy and can help the artery to increase in size or dilate.

The 12-week study included 78 men randomized into four groups: 21 men received topical testosterone and completed a supervised exercise

program including aerobic and strength exercises two to three times a week; 18 men received testosterone with no exercise; 20 men received a placebo and no exercise; and 19 men received a placebo with exercise. The exercise training was supervised in a research gymnasium at Fiona Stanley Hospital in Perth, and the program was overseen by an Accredited Exercise Physiologist (AEP).

The researchers found:

- Testosterone treatment increased the levels of the hormone to above average levels in 62% of men in the groups that received the treatment.
- Exercise training also increased testosterone level; however, the levels were highest among the men in the groups who received the testosterone supplement.
- Artery function and health improved in the groups who received exercise training; but no improvement was found in those who received testosterone without exercise training.
- Artery function in response to testing improved by 28% in the group who received exercise without testosterone, and by 19% in the group who received a combination of testosterone and exercise.

The researchers did not see changes in other tests that stimulated muscle cells in the middle of the artery wall, following exercise training, testosterone treatment or the combination of the two.

"The results of our study suggest that if you are a healthy but relatively inactive middle-aged or older man with increased abdominal girth, and you are worried about your risk of heart attack, stroke or diabetes, then an exercise program with some support and supervision can help to improve the function and health of your arteries," Green said. "Testosterone therapy may have some benefits, for example in

increasing muscle mass in the legs, however, we didn't find any benefits in terms of artery function, which is a determinant of future cardiovascular risk."

Green noted that the study's small size is a limitation, and this research lays the foundation for larger studies that could lead to health recommendations for men.

More information: *Hypertension* (2021). DOI: 10.1161/HYPERTENSIONAHA.120.16411

Provided by American Heart Association