Follow Your Heart

The link between exercise and heart health spurs new activity recommendations for children.
By Beth Puliti

The significant cardiovascular health benefits of exercise have been brought to light in recent published reports. One such call to action was published by the American Heart Association (AHA) in its journal, Circulation. The scientific statement called on schools to take the lead to make sure that America's youth participates in sufficient physical activity.

Activity in Schools

The number of overweight children in the U.S. has doubled in the past 2 decades, leading to increased risk of heart disease and Type 2 diabetes.1 Yet, in 2003, only 58.5 percent of male and 52.8 percent of female high school students (grades 9–12) were enrolled in physical education classes.2

Although schools are currently pressured to have their students perform higher on standardized tests, AHA says the nation's schools must also make an effort to promote activities designed to prevent obesity in children.

"Children and youth spend a substantial number of their waking hours in school, so it's important schools provide adequate physical activity," said Russell R. Pate, PhD, chair of the writing group for the AHA recommendations, in a press release.

"It doesn't mean backing down on academics—it's not an either/or thing. A balanced academic program should include PE and should also incorporate strategies to increase physical activity throughout the school day. Physical activity shouldn't stop at PE class," he added.

Still, 61.5 percent of children (ages 9–13) do not participate in any organized physical activity during non-school hours.2

Some Guidelines

In order to combat child obesity, AHA recommends the following guidelines in "Promoting Physical Activity in Children and Youth: A Leadership Role for Schools."

1. Schools should ensure all children and youth participate in a minimum of 30 minutes of moderate to vigorous physical activity during the school day, plus have the option of extra-curricular and school-linked community programs.

2. Schools should deliver evidence-based, health-related PE programs that meet national standards to students at all school levels. These programs should include moderate to vigorous physical activity for at least 50 percent of class time and teach students the motor and behavioral skills needed to engage in lifelong physical activity.

3. States and school districts should ensure that PE is taught by certified and highly qualified PE teachers at all school levels.

4. States should hold schools accountable for delivering PE programs that meet national standards for quality and quantity, including age-appropriate amounts of time per week spent active during class. Each state should include physical education in its core curriculum and instructional quality.

5. Schools should provide clubs, lessons, intramural sports and interscholastic sports programs that meet the physical activity needs and interests of all students.

6. Schools should promote walking and bicycling to school. School leaders should work with local government to ensure safe routes to school.

7. Child development centers and elementary schools should provide children with at least 30 minutes of recess each day.

8. Schools should provide evidence-based health education programs that emphasize behavioral skills to increase physical activity and decrease sedentary behaviors.

9. Colleges and universities should provide programs that produce teachers who are highly qualified to deliver PE and health-education programs.

Physical inactivity can lead to coronary artery disease, stroke, obesity, high blood pressure, low HDL and diabetes. To counter an unhealthy, sedentary lifestyle, the AHA suggests children and adolescents should take part in at least 60 minutes of moderate to vigorous physical activity daily.3

Activity and Arteries

Obesity isn't just a problem in America 's youth; it is also prevalent in American adults. In 2003, 136,500,000 American adults were overweight; 64,000,000 were obese.2

Limited physical activity is one easily adjustable factor linked to becoming overweight or obese. A study reported in the European Journal of Applied Physiology found physical activity can also reverse arterial dysfunction and improve the function of arteries when performed 2 hours after a high-fat meal.

Jaume Padilla, MS, a doctoral student in Indiana University Bloomington's Department of Kinesiology, was the lead author of the study.

"Arterial dysfunction, also known as endothelial dysfunction, is implicated in the origin and development of atherosclerotic cardiovascular disease, which is the leading cause of mortality..." he stated. "Both short-term and long-term aerobic exercise has been shown to improve endothelial function in a variety of clinical populations, including patients with obesity, diabetes and hypertension."

Exercise is a well-recognized option for prevention and treatment of cardiovascular diseases, and is therapeutically used in a variety of clinical trials, he said. Padilla and co-author and IU kinesiology professor, Janet P. Wallace, used exercise to counteract the negative effects of a high-fat meal on endothelial function.

"The goal of the study was to investigate if a single bout of aerobic exercise could counteract the postprandial attenuation in

endothelial function associated with the ingestion of a high-fat meal," explained Padilla.

After eating a high-fat meal, arteries no longer have the ability to get bigger in response to increased blood flow. This negative effect peaks about 4-6 hours following eating. During this time, arteries appear to look the same as arteries of someone who has heart disease.

However, Padilla and Wallace were able to show that exercise after a high-fat meal resulted in arteries appearing to look the same as arteries of a healthy person.

"Our findings suggest that a single bout of aerobic exercise (45 minutes) can not only counteract the postprandial endothelial dysfunction associated with the high-fat meal, but also increase function in apparently healthy adults," said Padilla.

Stimulating Activity
In order to obtain the results of exercise on the heart, Padilla and Wallace used ultrasound. They imaged the brachial artery (upper arm) and measured how much the artery expanded in response to an increase in blood flow. They found the artery reduced its capability to dilate following a high-fat meal.

Although it is not fully understood how exercising reverses and improves endothelial dysfunction, several hypotheses have been proposed in the literature.

"It is possible for exercise to act through a direct blood flow mechanism, through a decrease in oxidative stress and inflammation or through an increase in antioxidant activity," stated Padilla. "Research is now being focused on the understanding of this phenomenon."

In the study conducted by Padilla and Wallace, study subjects walked for 45 minutes on a treadmill at a light to moderate intensity after they ate their high-fat meal. The significance of participating in physical activity 2 hours after eating was to allow for a minimum digestion time.

Although this study supports the cardiovascular benefits of exercise and physical activity, Padilla and Wallace hope it will provide a greater impact.

"We hope these findings will stimulate people to become more active and educate the medical community about the potential of a non-pharmacological therapy such as exercise," said Padilla.

References:
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