

# Ballerinas and female athletes share quadruple health threats

May 30 2009

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This is an ultrasound test of artery function and an ultrasound image of artery.  
Credit: Medical College of Wisconsin

A study led by sports medicine researcher Anne Hoch, D.O., at The Medical College of Wisconsin in Milwaukee has revealed that young female professional dancers face the same health risks as young female athletes when they don't eat enough to offset the energy they spend, and stop menstruating as a consequence.

"These two components of the female athlete tetrad put them at higher risk for the other two; the cardiovascular and [bone density](#) deficits of much older, [postmenopausal women](#)," according to Dr. Hoch, associate professor of orthopaedic surgery and director of the Froedtert & the Medical College Women's [Sports Medicine](#) Center.

The researchers studied 22 professional ballerinas, all members of the

Milwaukee Ballet Company, to determine the prevalence of disordered eating, amenorrhea (lack of menstruation), abnormal vascular function and low bone density. Study findings were presented at the American College of Sports Medicine meeting in Seattle, May 30.

The dancers completed questionnaires on their menstrual patterns and eating habits, and underwent a blood test for hormonal levels. Thirty-six percent of the group had disordered eating habits and 77 percent were in a calorie deficit. Twenty-seven percent were currently amenorrheic, 23 percent had low bone mass density and nine percent were taking birth control.

Arterial ultrasound measurements revealed that 64 percent had abnormal artery dilation in response to blood flow.

"It was unknown if professional dancers without menstrual periods have evidence of vascular dysfunction, yet some characteristics of the tetrad were common in this group," says Dr. Hoch. "Eighty-six percent had one or more components, and fourteen percent had all four."

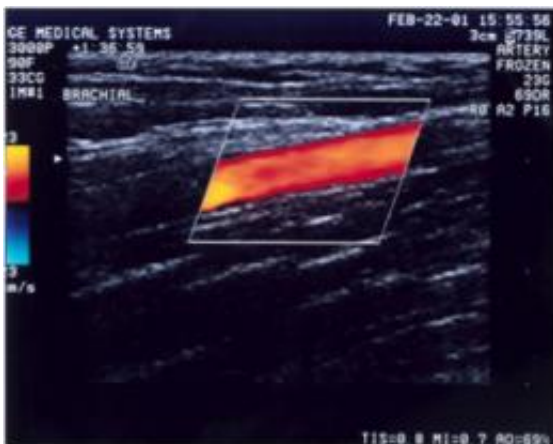
The study was funded by grants from the Clinical and Translational Science Institute Adult Translational Research Unit of the Medical College, and by the Steve Cullen Healthy Heart Club Funding of 2008.

Co authors of the study include: Paula Papanek, Ph.D., associate professor and director of exercise science at Marquette University; and at the Medical College - Heather Havlik, M.D., a sports medicine fellow; William Raasch, M.D., professor of orthopaedic surgery; Michael Widlansky, M.D., assistant professor of medicine in cardiology; Jane Schimke, clinical research coordinator, and David Gutterman, M.D., senior associate dean and professor of medicine in cardiology.

## High-dose Folic Acid Supplements Improved Vascular Function in Amenorrheic Runners

In a related study, presented earlier at the American Society of Sports Medicine meeting in Tampa, Fla., researchers at The Medical College of Wisconsin in Milwaukee found that four to six weeks of high-dose folic acid supplementation could improve vascular function in young female runners who were amenorrheic (not menstruating).

This is the first study to use folic acid supplementation to improve vascular function in young runners, and is important because folic acid may not only decrease cardiovascular risks but also improve athletic performance for these women. The research was conducted at Froedtert Hospital.



This is an ultrasound image of artery. Credit: Medical College of Wisconsin

"Previous studies have shown that amenorrheic women runners have decreased dilation in the main (brachial) artery of the arm in response to blood flow," says lead author Stacy Lynch, M.D., a women's sports

medicine fellow at the College. "Athletic amenorrhea has a hormonal profile similar to menopause, when the earliest sign of cardiovascular disease is reduced vascular dilation, which can limit oxygen uptake and affect performance."

While the benefits for women of an active lifestyle, including running, are profound and well-known, there are nearly three million girls in high school sports and approximately 23 million women who run at least six times a week. The prevalence of athletic-associated amenorrhea among these runners is now estimated at 44 percent.

The researchers recruited 16 female college or recreational runners, ages 18 to 35, who were not on birth control pills and had been running at least 20 miles a week for the past 12 months. These included six otherwise healthy women with reduced vascular function and irregular or absent menstrual periods, and a control group of ten with normal periods. Their vascular function was measured before and after treatment with 10 mg/day of folic acid for four to six weeks. Vascular function returned to normal in the amenorrheic women after folic acid supplementation, and it remained at normal levels in the control group despite supplementation.

Both children and adults require folic acid to produce healthy red blood cells and prevent anemia. Folic acid, also known as vitamin B9, folacin and collate, is the form of the vitamin needed during periods of cell growth.

## **Important Tips for Young Female Athletes:**

1. Be aware of components of the female athlete tetrad:

- Disordered eating,
- Pre exercise carbohydrates and hydration (2 hrs. prior to exercise) and a

recovery meal (within 30 minutes of exercise) are very important

- Menstrual dysfunction

Average age of menarche in US is 12.5. It's abnormal if periods don't start by age 15.

- Osteoporosis

"Irregular" weight bearing exercise, between ages 7 and 12, is most beneficial for long-term bone mineral density. Calcium requirements for ages 11 to 24, per the National Institutes of Health, are 1,500 mg of calcium and 400 mg of Vitamin D daily

- Early cardiovascular disease risk

2. ACL prevention programs are a MUST for female soccer, basketball and volleyball players, 6 weeks prior to season!

Source: Medical College of Wisconsin ([news](#) : [web](#))

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