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Vitamins D Supplements Strengthen Muscles, Helps Prevent Falls in the Elderly

A combination of vitamin D and calcium supplements, but not calcium alone, can significantly reduce the risk of falls and injuries among elderly women, according to a study by Swiss researchers.

Heike A. Bischoff, MD, of the University of Basel, Switzerland, and colleagues began their study aware of research showing that vitamin D both improves muscle function and enhances calcium metabolism. They hypothesized that vitamin D would "increase muscle strength, which would reduce the risk of falling."

Bischoff asked 122 elderly women, ranging in age from 63 to 99 years, to take a daily supplement containing either a combination of 800 IU of vitamin D and 1,200 mg of calcium or only 1,200 mg of calcium for three months.

At the beginning of the study, blood tests found that all of the subjects had low calcium levels, and nearly all were deficient in vitamin D.

The women were divided into two groups. For six weeks before supplementation, 15 women in what would be the vitamin D/calcium group suffered 22 falls, and 14 women in the calcium group had 20 falls.

During three-months of supplementation, 14 women in the vitamin D/calcium group had 25 falls – a significant decrease – but 18 women in the calcium group experienced 55 falls.

Based on a statistical analysis, Bischoff concluded that vitamin D/calcium supplements reduced the risk of falls by 49 percent over three months, although a less "conservative" analysis found a 62 percent reduction in falls. Women who had a history of falling seemed to benefit the most from the supplements.

"The present study adds to a growing body of literature, which should encourage the search for treatable causes, by showing that a simple, inexpensive, and well-tolerated intervention, such as vitamin D and calcium, may help to reduce the burden of falling in the elderly," Bischoff wrote.

In a separate study, Sarah L. Booth, PhD, of

Tufts University, and her colleagues investigated the relationship between bone-mineral density and vitamin K in 1,112 men and 1,479 women participating in the ongoing Framingham Heart Study. Vitamin K is needed for the formation of several proteins in bone.

Booth and her colleagues compared x-ray analyses of the subject's hip and spine bone-mineral density with their intake of vitamin K, based on dietary questionnaires. They found that women who consumed the least vitamin K, found in green vegetables, generally had lower bone-mineral density than those who ate the most vitamin K.

Vitamin K was not associated with bone-mineral density in men.

References: Bischoff HA, Stahelin HB, Dick W, et al. Effects of vitamin D and calcium supplementation on falls: a randomized controlled study. *Journal of Bone and Mineral Research*, 2003;18:343-351. Booth SL, Broe KE, Gagnon DR, et al. Vitamin K intake and bone mineral density in women and men. *American Journal of Clinical Nutrition*, 2003;77:512-516. □

High-Dose Vitamins E and C Boost Survival of Hospitalized Trauma Patients

Many people who initially survive a traumatic injury – such as from a serious car accident or a gunshot wound – die within days or weeks from infection or organ failure. Part of the reason is that a massive immune and inflammatory response to the injury (or subsequent infection) generates large numbers of free radicals, which can further damage tissues. These free radicals contribute to respiratory failure and multiple organ failure.

With the role of free radicals in mind, Avery B. Nathans, MD, of Harborview Medical Center, Seattle, and his colleagues treated 595 patients, nearly all of them young male trauma victims. The patients underwent surgery followed by conventional care in an intensive care unit (ICU). About half of the pa-

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tients received vitamin E (1,000 IU) through feeding tubes, as well as intravenous vitamin C every eight hours. They received the vitamins – a total of 3,000 IU of vitamin E and 3,000 mg of vitamin C daily – for as long as they were in the ICU, up to 28 days.

Patients receiving the antioxidant vitamins had a modest 19 percent lower risk of death from respiratory failure, compared with those receiving conventional care but no supplements. Patients receiving the vitamins also had a significant 57 percent lower risk of multiple organ failure during those 28 days.

In addition, Nathens reported that patients receiving the vitamins needed fewer days of mechanically assisted breathing support and spent fewer days in the ICU.

“This large, randomized prospective trial in...critically ill surgical patients suggests benefit from the routine, early prophylactic administration of alpha tocopherol and ascorbate,” Nathens wrote. “The lack of adverse effects, coupled with the minimal expense, supports that this combination is a reasonable therapeutic intervention in critically [ill] surgical patients.”

Reference: Nathens AB, Neff MJ, Jurkovich GJ, et al. Randomized, prospective trial of antioxidant supplementation in critically ill surgical patients. *Annals of Surgery*, 2002;236:814-22. □

Fish Oil Supplements Modify Cholesterol Plaque, Reduce Heart Risk

Over the past few years, researchers have shown that a person’s risk of heart attack is related to the susceptibility of cholesterol deposits, or plaque, to rupture, dislodge from the artery wall, and block an artery. High blood levels of C-reactive protein, a sign of inflamed blood vessels, greatly increase the risk of such plaque rupturing and causing a heart attack.

Researchers have also known that omega-3 fish oils – either in the diet or as supplements – significantly reduce the risk of heart disease and heart attack. The fish oils reduce blood clots, prevent arrhythmias, and lower triglyceride levels.

Now, researchers at the University of Southampton, England, have shown that omega-3 fish oils – well known for their anti-inflammatory properties – are quickly absorbed into artery plaque and reduce its tendency to rupture.

Philip C. Calder, PhD, and his colleagues conducted a study with 170 patients scheduled for surgery on their carotid artery. Before surgery, the patients were asked to take (1) 1.4 grams of omega-3 fish oils, rich in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), (2) 3.6 grams of omega-6 fatty acids in sunflower oil, or (3) no supplements.

Patients took the supplements for an average of 42 days.

After surgery, portions of the patients’ carotid arteries were saved and their plaque analyzed. Plaque from patients taking omega-3 fish oils had a higher proportion of EPA and DHA and a lower proportion of linolenic acid, an omega-6 fat, indicating that one type of fat can displace another.

In addition, plaque from patients taking the omega-3 fish oils had thick fibrous caps and no signs of inflammation. In contrast, plaque from the two other groups of patients were thinner, inflamed, and more likely to rupture.

The type of plaque most likely to rupture has a thin inflamed cap and large number of white blood cells, which release inflammatory chemicals. More stable plaque has a well-formed fibrous cap and relatively few white blood cells.

Calder wrote that the study found that omega-3 fish oils were absorbed into plaque in a relatively short time and that the fish oils had a “plaque-stabilizing” effect.

The fish oil supplements also led to significant reductions in the patients blood triglyceride levels.

Reference: Thies F, Garry JMC, Yaqoob P, et al. Association of n-3 polyunsaturated fatty acids with stability of atherosclerotic plaques: a randomized controlled trial. *Lancet*, 2003;361:577-485. □

Coenzyme Q10 Lowers Blood Pressure, Improves Glycemic Control in Diabetics

Supplemental coenzyme Q10, a vitamin-like nutrient, can lower blood pressure and help control blood sugar in people with type 2 diabetes, according to researchers at the University of Western Australia.

Gerald F. Watts, MD, PhD, and his colleagues asked 74 men and women with diabetes to take 100 mg of CoQ10 twice daily, 200 mg of fenofibrate (a cholesterol-lowering drug) each morning, both, or neither for 12 weeks. The subjects ranged in age from 31 to 75 years.

The patients taking CoQ10 had significant decreases in systolic and diastolic blood pressure, on average 6.1 mmHg and 3.9 mmHg, respectively. In addition, glucose control, as measured by HbA_{1c}, improved slightly.

Fenofibrate did not have these benefits, though patients taking both CoQ10 and fenofibrate benefited slightly more than did those taking only CoQ10.

Reference: Hodgson JM, Watts GF, Playford DA, et al. Coenzyme Q10 improves blood pressure and glycaemic control: a controlled trial in subjects with type 2 diabetes. *European Journal of Clinical Nutrition*, 2002;56:1137-1142. □

Vitamin B6 Levels Low in Patients with Inflammatory Bowel Disease

People with inflammatory bowel disease (IBD) run a high risk of being deficient in vitamin B6, according to a new study by Italian researchers. The vitamin plays diverse roles in the body's production of neurotransmitters, such as serotonin, and in the transmission of nerve signals.

Maurizio Vecchi, MD, of the University of Milan and his colleagues studied 61 patients with IBD, including 32 with Crohn's disease and 29 with ulcerative colitis. He also compared the IBD patients with 183 healthy subjects.

Vecchi determined the patients' vitamin B6 levels by measuring blood levels of the active form of the vitamin, pyridoxal-5'-phosphate (PLP).

Thirteen percent of IBD patients were deficient in vitamin B6, compared with only 4.9 percent of healthy subjects. Overall, blood levels of vitamin B6 were almost one-third lower in patients with IBD, compared with healthy subjects.

In addition, patients with active IBD were far more likely to have low vitamin B6 levels than were patients in the quiescent phase of the disease. Patients with low vitamin B6 levels also had higher blood levels of C-reactive protein, an indicator of inflammation intensity.

The findings were particularly significant because low vitamin B6 levels are a risk factor for blood clots, and IBD patients have a relatively high risk of developing blood clots, Vecchi wrote.

Reference: Saibeni S, Cattaneo M, Vecchi M, et al. Low vitamin B6 plasma levels, a risk factor for thrombosis, in inflammatory bowel disease: role of inflammation and correlation with acute phase reactants. *American Journal of Gastroenterology*, 2003; 98:112-117. □

Probiotic Drink, But Not Yogurt, Reduces Levels of Pathogenic Bacteria in Nose

People who consume a probiotic-rich fermented milk drink can greatly reduce and often eliminate disease-causing bacterial from their nose. That, in turn, might reduce their risk of an upper respiratory tract infection.

Probiotics are beneficial bacteria that inhabit the intestine and enhance immune function. These bacteria compete against disease-causing species and, also, stimulate the body's release of infection-fighting immune proteins. But their effect, according to this study, can go beyond the health of the gut.

Ulrich Glück, MD, and Jan-Olaf Gebbers, MD, of the Institute of Pathology and Environmental

Medicine, Lucerne Switzerland, asked 209 men and women to consume either a probiotic fermented milk drink (65 mL) or standard yogurt (180 grams) daily for three weeks. Bacteria from the subjects noses were obtained by swabs and analyzed at the beginning and end of the study.

The upper respiratory tract contains a variety of bacteria, some of which are pathogenic. *Staphylococcus aureus*, *Streptococcus pneumoniae*, and B-Hemolytic streptococci are among the disease-causing bacteria.

After three weeks, people consuming the probiotic milk drink, rich in *Lactobacillus* GG and other beneficial bacteria, had a significant reduction in the pathogenic bacteria in their noses, but no such effect was found for the people consuming yogurt.

Overall, the numbers of disease-causing bacteria in the noses of people consuming the probiotic milk drink declined 19 percent during the three-week study.

The researchers wrote that the probiotics may have increased the activity of a particular type of immune cell, B lymphocytes, which migrated to the nose and there increased production of other infection-fighting compounds.

Reference: Glück U, Gebbers JO. Ingested probiotics reduce nasal colonization with pathogenic bacteria (*Staphylococcus aureus*, *Streptococcus pneumoniae*, and B-Hemolytic streptococci). *American Journal of Clinical Nutrition*, 2003;77:517-520. □

Different Types of Carotenoids Protect Skin from Sunburn

Skin is exposed to a variety of environmental factors, from air pollution to ultraviolet radiation (UV) in sunlight, that can generate free radicals and damage proteins, fats, and DNA in epidermal cells. For protection, skin cells contain a variety of antioxidants, including vitamins C and E and carotenoids. Several studies have found that UV radiation depletes antioxidant levels in the skin, and that beta-carotene supplements can bolster the skin's resistance to sunburn.

In the latest research, Wilhelm Stahl, PhD, of the Heinrich Heine University, Dusseldorf, Germany, and his colleagues asked 36 men and women to take one of three supplements daily for 12 weeks: 24 mg of beta-carotene (equivalent to 40,000 IU daily); a mixed-carotenoid supplement containing 8 mg each of beta-carotene, lutein, and lycopene; or a placebo. The mixed-carotenoid supplement reflected the principal carotenoids found in a diet rich in fruits and vegetables.

Before taking the supplements and then after six

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Quick Reviews of Recent Research

• Vitamin E may reduce bladder cancer deaths

Researchers tracked the health of almost 1 million adults in the United States from 1982 through 1998. People who took vitamin E supplements for at least 10 years were 40 percent less likely to die from bladder cancer. Taking vitamin E for less time, or taking vitamin C, had no protective effect.

Jacobs EJ, et al. *American Journal of Epidemiology*, 2002;156:1002-1010.

• Cancer patients have low antioxidant levels

Patients with advanced cancers often have low blood levels of antioxidants. In this study, researchers studied 15 patients with breast cancer, 15 with prostate cancer, 11 with colorectal cancer, and 30 healthy subjects. All of the cancer patients had elevated levels of C-reactive protein, a sign of inflammation. C-reactive protein levels were inversely related to the patients' blood levels of vitamin A, vitamin E, lutein, lycopene, alpha-carotene, and beta-carotene.

McMillan DC, et al. *Clinical Nutrition*, 2002;21:161-164.

• Magnesium sulfate prevents preeclampsia

Researchers at 14 medical centers treated 1,650 women with severe preeclampsia, a serious complication of pregnancy, with either intravenous administration of magnesium sulfate or oral intake of the drug nimodipine. Magnesium was more effective

Carotenoids and Sunburn...

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and 12 weeks, the subjects' backs were exposed to enough artificial UV radiation (mimicking sunlight) to induce erythema, or a mild sunburn. After 12 weeks, the degree of erythema in both groups taking carotenoid supplements was significantly less than it had been at the beginning of the study. Furthermore, both types of carotenoid supplements provided similar protection. Subjects taking the placebos gained no benefits.

The researchers acknowledged that the sun protection was not as great as it would have been with a sunscreen. "However, increasing the basal protection system contributes to the permanent defense against UV light-mediated skin damage."

Previous studies have shown that a combination of oral carotenoids and topical sunscreen afforded better skin protection than did sunscreen alone.

Reference: Heinrich U, Garnter C, et al. Supplementation with beta-carotene or a similar amount of mixed carotenoids protects humans from UV-induced erythema. *Journal of Nutrition*, 2003;133:98-101. □

than nimodipine in preventing seizures in the patients. Less than 1 percent of the women receiving magnesium had seizures, compared with 2.6 percent of those receiving the drug.

Belfort MA, et al. *New England Journal of Medicine*, 2003;348:304-311.

• Green tea may lower risk of heart attack

Japanese researchers studied the heart health of 393 patients who underwent angiography for suspected coronary artery disease. Patients who consumed green tea, a rich source of antioxidants, did not have a lower risk of developing heart disease per se. However, patients who consumed at least one cup of green tea daily were 42 percent less likely to have a heart attack.

Hirano R, et al. *American Journal of Cardiology*, 2002;90:1150-1153.

• Selenium reduces DNA damage in prostate

A large clinical study several years ago found that selenium supplements (200 mcg daily) significantly reduced the risk of prostate cancer in men. Cancers arise from DNA damage, so researchers fed beagles two different dosages of two different forms of selenium supplements, selenomethionine and high-selenium yeast. Each of the selenium supplements reduced the rate of DNA damage in the animals' prostate cells, which would likely lower the risk of cancer.

Waters DJ, et al. *Journal of the National Cancer Institute*, 2003;95:237-241.

• Zinc supplements help in tinnitus

Forty-one patients with tinnitus, commonly referred to as a "ringing" in the ears, were given either 50 mg of zinc or placebo for two months. Tests indicated that 46 percent of patients taking zinc improved, though 82 percent of patients in the zinc group reported subjective improvements.

Arda HN, et al. *Otology & Neurotology*, 2003;24:86-89.

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Post Office Box 30246 • Tucson AZ 85751-0246 USA

Editor and Publisher: **Jack Challeng**
Copy Editor: **Mary E. Larsen**

Medical and Scientific Advisors:
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Ralph K. Campbell, MD Polson, Montana • **Peter Langsjoen, MD** Tyler, Texas
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