

# Small Reduction in Fractures, Falls With Enough Vitamin D

BY JEFF EVANS  
Senior Writer

ARLINGTON, VA. — People who take sufficiently high supplement doses of vitamin D or those who already have adequate levels of vitamin D were found to have a small but significantly reduced risk of specific fractures, falls, and low bone mineral density, according to an Agency for Healthcare Research and Quality report on the effect of vitamin D supplements on bone health outcomes.

Dr. Ann B. Cranney and her associates at the University of Ottawa Evidence-Based Practice Center extensively reviewed the literature on the effects of 25-hydroxyvitamin D (25[OH]D) concentration or vitamin D supplementation. She presented the results of metaanalyses on studies that met eligibility criteria at a conference sponsored by the American Society for Bone and Mineral Research.

It was not possible to quantitatively summarize the results of 10 randomized controlled trials or 31 observational studies that examined the effect of 25(OH)D levels on bone health outcomes in postmenopausal women and older men, so Dr. Cranney and her colleagues categorized the evidence supporting the effect of the vitamin D metabolite as good, fair, or inconsistent. For serum 25(OH)D levels of at least 50-80 nmol/L, there was good evidence of an association with increased bone mineral density in the hip, fair evidence of an inverse association with the risk of hip fracture, and inconsistent evidence of an association with a reduction in falls and functional measures such as grip strength and body sway.

In 74 randomized controlled trials of supplementation with vitamin D<sub>3</sub> or D<sub>2</sub>, the investigators found that 25(OH)D levels increased more with supplementation with vitamin D<sub>3</sub> than with vitamin D<sub>2</sub>. Data from 16 randomized controlled tri-

als provided enough information on 25(OH)D levels in control and treatment groups at baseline and at the end of the study to determine that supplementation with 700 IU/day or more of vitamin D<sub>3</sub> was associated with a drop in serum parathyroid hormone levels.

The investigators also calculated from the trials that 1 IU vitamin D<sub>3</sub> raises serum 25(OH)D concentration by 0.016 nmol/L.

Trials that used supplements with either vitamin D<sub>3</sub> or vitamin D<sub>2</sub> did not show a significant effect on reducing the risk of fractures overall or of hip fractures in particular. Also, supplementation with vitamin D plus calcium or vitamin D alone did not have a significant effect on the risk of nonvertebral fractures.

**In eight trials, vitamin D<sub>3</sub> supplements of 700 IU/day or more significantly reduced the risk of nonvertebral fractures by 15%, researchers found.**

But in eight trials, supplements of 700 IU/day or more vitamin D<sub>3</sub> significantly reduced the risk of nonvertebral fractures by 15%. This risk reduction was primarily driven by two trials of individuals in an institutional setting, who had a 22% reduction in the risk of nonvertebral fractures. Supplements of 700 IU/day or more vitamin D<sub>3</sub> also significantly lowered the risk of hip fractures; trials in an institutional setting, rather than in the community, factored strongly in the overall results, she noted.

The investigators found that participants in trials of vitamin D<sub>3</sub> supplementation that recorded serum 25(OH)D concentrations of 74 nmol/L or higher had a significant 23% lower risk of nonvertebral fractures than did participants of trials that did not achieve a 25(OH)D level of 74 nmol/L.

Vitamin D supplements did not reduce the risk of falls overall in 12 trials. But vitamin D supplements significantly lowered the risk of a fall by 11% in six trials in which falls were defined or independently ascertained, Dr. Cranney said.

The Agency for Healthcare Research and Quality requested the report on behalf of the National Institutes of Health Office of Dietary Supplements. ■

## Study Links Low Bone Mineral Density To Exercise-Induced Myocardial Ischemia

CHICAGO — Low bone mineral density was associated with exercise-induced myocardial ischemia in a retrospective analysis of more than 1,000 patients.

These are the first study results to show a link between bone mineral density (BMD) and exercise-induced ischemia using exercise echocardiography, Dr. Aaron M. From and his associates said in a poster presented at the annual scientific sessions of the American Heart Association.

Results from prior studies had linked low BMD and an increased risk of stroke, atherosclerosis, and cardiovascular death, said Dr. From, a physician at the Mayo Clinic in Rochester, Minn.

The analysis included all patients who underwent dual-energy x-ray absorptiometry of the femoral neck at the Mayo Clinic during August 1998–October 2003 who also had an exercise echocardiography examination soon after the bone scan. The researchers identified 1,142 patients who fulfilled these criteria. All of the patients

were referred for both studies by their physicians.

The group included a total of 643 patients with low BMD, including 126 with osteoporosis and 517 with osteopenia. The remaining 499 patients had BMDs in the normal range. The most common reason for the exercise echo examination was chest pain/dyspnea, in 57% of the patients; 6% had known coronary artery disease.

The analysis showed that patients with the lowest BMD (a T score of -4 to -3) had the shortest exercise duration, 5.8 minutes, while patients with the highest T scores (+1 to +2) had the longest exercise duration, 8.9 minutes.

In a multivariate analysis that controlled for baseline clinical and demographic differences, the risk of having exercise-induced ischemia rose by 22% for every one-point decrease in T score (representing one standard-deviation decrease in T score) a statistically significant difference, Dr. From and his associates reported in the poster.

—Mitchel L. Zoler

## Fish Oil, Multivitamin Both Boost Stores of Vitamin D

BY JEFF EVANS  
Senior Writer

ARLINGTON, VA. — Fish oil capsules and multivitamin tablets that contain 10 mcg of vitamin D<sub>3</sub> provide the same increase in stored levels of the vitamin when taken daily during a 4-week period, Kristin Holvik reported at a conference sponsored by the American Society for Bone and Mineral Research.

Even though many types of vitamin supplements are on the market, little is known about whether the bioavailability of vitamin D<sub>3</sub> (cholecalciferol) differs when it is sequestered in fat-containing capsules as opposed to solid tablets, noted Ms. Holvik, a Ph.D. student at the Institute of General Practice and Community Medicine at the University of Oslo.

In a randomized trial, 55 healthy young adults (34 females and 21 males) received 28 days of supplementation with either fish oil capsules or multivitamin

tablets, each of which was taken once daily and contained 10 mcg vitamin D<sub>3</sub> (an amount equivalent to 400 IU).

The participants completed a self-administered questionnaire about diet and sun exposure and had a nonfasting venous blood sample drawn at the beginning and end of the study, which took place in Oslo in late winter 2005, according to Ms. Holvik. She won an ASBMR Young Investigator Award for her research, which she presented during a poster session at the conference.

Serum 25-hydroxyvitamin D levels in individuals who took fish oil capsules increased from an average of 48.5 nmol/L to 80.4 nmol/L at the end of the study.

Multivitamin users had a similar rise in serum 25-hydroxyvitamin D levels from a mean of 40.3 nmol/L to 76.5 nmol/L. On average, the participants were aged about 28 years and had a body mass index of about 24 kg/m<sup>2</sup>. ■

## Weight Loss by Exercise Does Not Lower BMD

BY MELINDA TANZOLA  
Contributing Writer

Exercise-induced weight loss does not lead to declines in bone mineral density at fracture-relevant sites after 12 months, but weight loss caused by calorie restriction does, according to results of a randomized, controlled trial of 48 adults.

Regional BMD at the total hip and at the intertrochanter decreased significantly more with calorie restriction than they did without intervention in a control group.

BMD did not change significantly with exercise, compared with controls, study investigators reported.

The researchers randomized 48 nonobese but mostly overweight adults aged 50-60 years to three groups. The 19 subjects in the calorie-restriction group decreased energy intake by 16% during the first 3 months and by 20% during the subsequent 9 months.

The 19 subjects in the exercise group decreased overall energy intake by the same amount through exercise; they exercised a mean of 5.8 times per week for 62.5 minutes per session. The most common modes of exercise were walking and/or jogging,

followed by elliptical training and cycling.

The remaining 10 participants did not receive advice to change their diet or exercise habits, wrote Dr. Dennis T. Villareal of Washington University, St. Louis, and colleagues (Arch. Intern. Med. 2006;166:2502-10).

Overall, in the calorie restriction group, BMD decreased 2.2% at the lumbar spine, 2.2% in the total hip, and 2.1% in the intertrochanter.

Markers of bone turnover increased significantly in both the calorie-restriction and exercise groups.

Relative reductions in body weight after 1 year were similar with calorie restriction (10.7%) and with exercise (8.4%), whereas the control group did not lose weight (1.2%).

These findings indicate that exercise was associated with weight loss but not loss of BMD, whereas weight loss due to calorie restriction was significantly associated with changes in hip BMD.

“Because the amount of exercise required to achieve clinically meaningful weight loss is large, a more practical approach for weight reduction is a combination of calorie restriction and exercise,” the authors wrote. ■