Medical Xpress

Dietary calcium is better than supplements at protecting bone health

June 19 2007

Women who get most of their daily calcium from food have healthier bones than women whose calcium comes mainly from supplemental tablets, say researchers at Washington University School of Medicine in St. Louis. Surprisingly, this is true even though the supplement takers have higher average calcium intake.

Adequate calcium is important to prevent osteoporosis, which affects an estimated 8 million American women and 2 million American men. Another 34 million Americans have low bone mass, placing them at increased risk for osteoporosis. Calcium consumption can help maintain bone density by preventing the body from stealing the calcium it needs from the bones.

The researchers' conclusions about calcium intake, published in the May issue of the American Journal of Clinical Nutrition, came from a study of 183 postmenopausal women. The researchers asked the women to meticulously detail their diet and their calcium supplement intake for a week. "We assumed that this sample represented each woman's typical diet," says senior author Reina Armamento-Villareal, M.D., assistant professor of medicine in the Division of Bone and Mineral Diseases and a bone specialist at Barnes-Jewish Hospital. "In addition to analyzing the volunteers' daily calcium intake, we tested bone mineral density and urinary concentrations of estrogen metabolites."

The researchers found that the women could be divided into three groups: one group, called the "supplement group," got at least 70 percent

of their daily calcium from tablets or pills; another, the "diet group," got at least 70 percent of their calcium from dairy products and other foods; and a third, the "diet plus supplement group," consisted of those whose calcium-source percentages fell somewhere in between these ranges.

The "diet group" took in the least calcium, an average of 830 milligrams per day. Yet this group had higher bone density in their spines and hipbones than women in the "supplement group," who consumed about 1,030 milligrams per day. Women in the "diet plus supplement group" tended to have the highest bone mineral density as well as the highest calcium intake at 1,620 milligrams per day.

The hormone estrogen is known to maintain bone mineral density. But the standard form of estrogen is broken down or metabolized in the liver to other forms - some active and some inactive. Urinalysis showed that women in the "diet group" and the "diet plus supplement group" had a higher ratio of active to inactive estrogen metabolites than women in the "supplement group."

"This suggests that dietary calcium is associated with a shift in estrogen metabolism that favors production of active forms of estrogen," says Armamento-Villareal. "Although we're not yet certain what underlies this effect, it could be that nutrients other than calcium cause this shift. It's also known that dairy products, which are a major source of calcium, can contain active estrogenic compounds, and these can influence bone density and the amount of estrogenic metabolites in the urine."

Calcium supplements differ in how well their calcium can be absorbed, and this also could play a role in the study's findings, according to its authors. For example, calcium carbonate tablets need to be taken with a meal so that stomach acid can facilitate absorption, but calcium citrate tablets don't have this limitation. If the study participants taking calcium carbonate weren't conscientious about the timing of their supplements,

they might not have received the highest benefit from them.

"Only about 35 percent of the calcium in most supplements ends up being absorbed by the body," Armamento-Villareal says. "Calcium from the diet is generally better absorbed, and this could be another reason that women who got a high percentage of calcium in their food had higher bone densities."

Although dairy foods are excellent sources of calcium, Armamento-Villareal suggests that individuals with dairy sensitivities could consume other calcium-rich food sources such as calcium-fortified orange juice. Dark green leafy vegetables also contain calcium, but it is not as readily absorbed as calcium from dairy sources.

Source: Washington University