FORTIFIED DAIRY FOODS IMPROVE BONE HEALTH MORE THAN CALCIUM ALONE

This 12-month, randomized, controlled trial in 101 postmenopausal women in Greece, examined whether calcium supplementation could be as effective in achieving favorable bone mass changes as is a holistic approach including nutrition education and dairy products fortified with calcium and vitamin D. The authors say that in southern Europe, calcium supplementation alone is typically used for osteoporosis prevention, since it is assumed that people living in a Mediterranean climate will receive enough vitamin D from sunlight. The researchers randomly assigned participants to one of three groups: 1) Dairy group – encouraged to consume 3 portions of low-fat milk and yogurt fortified with calcium and vitamin D for a total of ~1200 mg calcium and 7.5 mcg (300 IU) vitamin D and nutrition education sessions; Calcium group -- ~1200 mg total calcium (supplements plus usual diet); Control group – followed usual low-calcium (<700 mg/day) diet. The researchers assessed dietary intake using a 3-day food record and food models provided by the Western Dairy Council in Thornton, Colorado. They also estimated physical activity and measured sun exposure of the participants.

Results showed that the dairy group had the most favorable effects on nutrient intake, biochemical indexes of bone metabolism, and improvements in bone density. Specifically:

- Both the dairy group and the calcium group achieved the recommended calcium intake of close to 1200 mg/day for this age group.
- The dairy group had greater intakes of protein, magnesium, phosphorus, and vitamin D than the other two groups.
- Total energy intake, physical activity, and sunlight exposure did not differ between groups.
- There were more favorable changes in all the indexes (IGF-1, vitamin D status, parathyroid hormone, type 1 collagen cross-linked C-telopeptide) of bone metabolism in the dairy group when compared to the other groups.
- The dairy group had significantly higher pelvis, total spine, and total body bone mineral density (BMD) than the other two groups. In contrast, the control group had significant decreases in total spine and total-body BMD.
- At five months, a favorable (lower) PTH level was associated with higher calcium and magnesium intake. At 12 months, a higher magnesium intake was associated with pelvis BMD and protein intake with blood levels of IGF-1. IGF-1 is a hormone-like peptide that has been reported to stimulate bone formation.

The authors conclude, "Our findings show that the application of a holistic approach combining nutrition education and consumption of fortified dairy products for a period of 12 months induced favorable changes in biochemical indexes of bone remodeling, calciotropic hormones, and pelvis, total spine, and total-body BMD." The authors attribute these positive changes to the greater intakes of calcium, vitamin D, and "other less studied ingredients of dairy products." They add, "Milk ingredients as a whole may be more effective than the sum of their individual parts." [Manios Y, et al., *Am J Clin Nutr*, 86: 781-789, 2007]