International Osteoporosis Foundation

FOOD AND NUTRITION - THE EVIDENCE

The following are some facts concerning food, nutrition and osteoporosis.

Building bone mass, reducing bone loss and fracture rates, and preventing falls

- Studies in children and adolescents have shown that supplementation with calcium, dairy calcium enriched foods or milk enhances the rate of bone mineral acquisition. (Refs. 1, 2 and 3, respectively)
- Adequate levels of calcium intake can maximize the positive effect of physical activity on bone health during the growth period of children. (Ref. 4)
- Calcium supplementation has been shown to have a positive effect on bone mineral density in postmenopausal women. (Ref. 5).
- Calcium and vitamin D supplementation reduces rates of bone loss and also fracture rates in older male and female adults, and the elderly. (Refs. 6, 7, 8). In institutionalized elderly women, this combined supplementation reduced hip fracture rates. (Ref. 7)
- Fruit and vegetable intake was positively associated with bone density in a study in men and women. The exact components of fruits and vegetables which may confer a benefit to bone are still to be clarified. (Refs. 9, 10)
- Supplementation with both vitamin D and calcium, compared with calcium alone, reduced body sway in elderly women, suggesting that correction of vitamin D deficiency may improve neuromuscular function and reduce the propensity to fall. (Ref. 11)
- In a study in elderly men and women, higher dietary protein intake was associated with a lower rate of age-related bone loss (12)

Nutritional rehabilitation after fracture

- Poor nutritional status, especially with respect to protein intake, is an important risk factor for hip fracture, and can also contribute to poor recovery. In the NHANES I Study, hip fracture rates were higher in women with low energy (calorie) intake, low body weight, low serum albumin levels and indices of low muscle strength. (Ref. 13)
- Randomized, clinical trials in patients with hip fracture have demonstrated the beneficial effects of giving protein supplements on the clinical outcome following acute orthopedic management. Protein supplementation resulted in fewer deaths, shorter hospital stays, and a greater likelihood of return to independent living. (Refs. 14, 15, 16)

Negative dietary-associated factors

- Moderate alcohol intake is not thought to be harmful to bone. However, chronic alcohol abuse is detrimental to bone health, with one of the mechanisms being a direct toxic effect on bone-forming cells. (Ref. 17)
- Extreme thinness is a risk factor for osteoporosis. Anorexia nervosa can be a cause of amenorrhea; the onset of anorexia nervosa frequently occurs during puberty, the time of life when maximal bone mass accrual occurs, thereby putting adolescent girls with anorexia nervosa at high risk for reduced peak bone mass. (Ref. 18)
- Lactose intolerance has been shown to be associated with low bone mass and increased risk of fracture due to low milk (calcium) intake. (Ref. 19)
- Dairy foods, calcium-set tofu, some green vegetables, and small canned fish with soft bones (e.g. sardines, salmon) provide the most readily-available sources of dietary calcium. Although some plant foods also contain appreciable amounts of calcium, some contain substances that can inhibit calcium absorption, e.g. oxalates in spinach and rhubarb, and phytates in dried beans. Good plant sources of calcium, which are low in such substances, include broccoli, kale and bok choy. (Ref. 20)

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