Heaney finds the least fault with the tracer method. When the test nutrient is properly tagged, he has found tracer methods to be “highly sensitive and reproducible, and depending upon the tracer used, [they] can be very quick and inexpensive.” It is important to recognize that bioavailability of pure salts is not the same as bioavailability of the pharmaceutical formulations. In Dr. Heaney’s experience “the pure salt is often somewhat better absorbed than the pharmaceutical mixture.”

In evaluating human studies of a preparation’s bioavailability, Dr. Heaney says that subject factors (i.e., age, murosoal mass, intestinal transit time, and nutritional status) can affect outcome. People with calcium deficiencies are more likely to absorb supplemental calcium than those with diets high in calcium. He also notes that absorption increases when taking calcium supplements in divided doses throughout the day “by as much as 80% relative to the same intake ingested as a single bolus.” Other factors that may increase calcium absorption, according to the National Nutrition Foods Association, include exercise, increase in vitamin D levels, intestinal acid, ingestion with a meal, acidic amino acids, and increased metabolic needs caused by growth, pregnancy, and lactation.

Although literature about calcium supplements is primarily aimed at supporting bone health, calcium and the salts have other positive effects. Unabsorbed calcium reduces the risk of kidney stones and colon cancer by combining with oxalic acid, bile acids, and other harmful substances left over from digestion. Carbonate, lactate and citrate salts may help neutralize a diet that is high in acid-forming foods. Dr. Heaney says that phosphate salts of calcium may be especially helpful for the elderly. Phosphorus is the second most abundant mineral, after calcium, in bone. Given the widespread distribution of the mineral in animal proteins, nuts, legumes, grains, and soda drinks, few realize that the elderly, particularly those receiving bone-strengthening drugs and supplemental calcium, may not be getting enough phosphorus. “Without adequate attention to meeting the phosphate requirements for bone building,” Dr. Heaney warns, “therapeutic success in these patients may be limited.”

Dr. Heaney questions manufacturers’ pursuit of enhanced bioavailability for poorly absorbed nutrients like calcium. Focusing on bioavailability, according to Dr. Heaney, “seems inappropriate and misdirected from both cost benefit and nutritional considerations.” He sees little point in buying a supplement that is absorbed at 40% efficiency that costs twice as much as one absorbed at 30% efficiency. Dr. Heaney, who is considered an expert on calcium, has not found a calcium supplement that meets manufacturer’s claims of superiority that justify significantly higher prices.

While no calcium supplement is notably superior to any other, some supplements contain harmful metals. A study by E. A. Ross, N. J. Szabo, and I. R. Tabettt (JAMA, September 20, 2000) reports that some over-the-counter natural and refined calcium carbonate products, as well as bone-meal and dolomites, contain high amounts of lead. The authors recommend using supplements from reputable manufacturers that test for lead content.


McGinnis, Charles C., PhD. Calcium & Osteoporosis: A Weak Link. Cornell Cooperative Extension www.cce.nysed.edu/food

NHF Calcium website www.nhfa.org/servicessoureng/blend/calcium.htm

Ross EA, Szabo N, Tabettt I. Lead content of calcium supplements. JAMA 2000; Sept 20

Drug-Induced Osteoporosis

Some pharmaceutical drugs are known to cause bone loss. In November 2004, Depo-Provera Contraception Injection became the latest to join the list that also includes glucocorticoid medications, chemotherapy drugs for prostate and breast cancers, and SSRI antidepressants. The new black-box warning for Depo-Provera says that the drug causes bone density loss the longer the woman uses it and that this loss “may be clinically relevant.” Because the bone loss cannot always be reversed, the FDA does not recommend that women who have other options use Depo-Provera as a long-term birth control method (e.g., longer than two years).

People who take glucocorticoid medicine (e.g., prednisone, prednisolone, dexamethasone, and cortisol) for more than three months also run the risk of osteoporosis, according to the American College of Rheumatology. Glucocorticoid drugs slow the rate of bone formation. They also “interfere with the body’s handling of calcium and affect levels of sex hormones, leading to increased bone loss.”

Androgen deprivation therapy, given to prostate cancer patients, is another treatment that increases the risk of osteoporotic bone fractures. Like glucocorticoids, the risk increases the longer the therapy is used. Despite the therapy’s known effect on bones, few patients receive any screening, preventive care, or bone-loss treatment, according to Tawee Tanvetvanyon, MD, Loyola University Chicago Stritch School of Medicine.

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Exercise & Osteoporosis

To create and maintain healthy bones, people must engage in physical activity. Mechanical stress, such as walking, stair climbing, weight-lifting, or hard physical labor, apparently causes calcium phosphate crystals in the bone to produce tiny electric currents. This piezoelectric effect stimulates bone-building cells (osteoblasts) to deposit more mineral salts to strengthen bones in the stressed areas. Without mechanical stress for a prolonged period, bone-resorbing cells (osteoclasts) will tear down unnecessary bone. Exercise encourages the secretion of calcitonin, a thyroid hormone that inhibits the bone-resorbing osteoclasts. In addition to strengthening muscle and promoting bone density, exercise improves balance and coordination, which decrease the risk of falling. Most fractures that afflict the elderly result from a combination of falling and brittle bones.

The Mayo Clinic staff recommends a combination of weight-bearing activities (e.g., walking, jogging, stair climbing), strength-training (e.g., weight-training, yoga), and back-strengthening exercises (e.g., pilates, yoga). Such a combination will promote bone density, strengthen muscles, and improve balance and coordination. Mayo Clinic recommends weight-bearing activity each day and strength training and back-strengthening exercises at least two and no more than four times a week. The staff warns against working the same back muscles on consecutive days.

People who already have osteoporosis need to seek the advice of a doctor or physical therapist who can design an appropriate strength training program. The Mayo Clinic says walking (at least a mile a day) is usually the best weight-bearing exercise for people with osteoporosis. Care should be taken when bending forward at the waist because such activities increase the risk of compression fractures in the spine. Activities that involve heavy lifting – including lifting bags of groceries and loads of laundry – should also be avoided. Twisting movements (common in golf or bowling) and the abrupt stops, starts, and weight shifts that occur during racket sports further stress the spine. Exercise programs have helped middle-aged and older women reduce their rate of bone loss and increase bone mass. American Society of Bone and Mineral Research (ASBMR) Committee. Role of Physical Activity In Exercise: Prevent and Treat Osteoporosis. www.asbmr.org/content/articles


The Mayo Clinic staff recommends exercise for osteoporosis, please see action safely. September 21, 2004. www.mayoclinic.com

Ipriflavone

Ipriflavone (isopropoxysilanol), a synthetic isoflavone derivative, was used as a prescription treatment for osteoporosis in Japan, Argentina, and other countries. According to research (mostly from overseas), ipriflavone can inhibit bone breakdown, increase osteoblast activity, and reduce the pain of osteoporotic fractures. Susan E. Brown, PhD, CCN, who directs the Osteoporosis Education Project, has a very informative article about ipriflavone at www.betterbones.com.

She found 31 human clinical studies on ipriflavone that were published in English from 1999 through April 2000. Of the 31, 18 studies were placebo-controlled. About half of the placebo-controlled studies show that ipriflavone increases bone density or reduces bone loss more effectively than calcium alone.

A multi-centered (Belgium, Denmark, Italy) three-year European study (MEPS) reported less encouraging results at the American Society of Bone Mineral Research in Toronto in October 2000. In this study, 471 osteoporotic women with no prevalent vertebral fracture took ipriflavone and calcium or