



# Total Calcium

For Healthy Bones

By Dr. Lynn Toohey

Osteoporosis is a major, disabling epidemic affecting an estimated 20 million Americans (*U.S. Dept of Health and Human Services Public Health Service, National Institutes of Health, "Medicine for the Layman: Osteoporosis"*). The United States has been reported to have the highest rate of osteoporotic fractures in the world: 1.3 million fractures occur each year that are attributed to osteoporosis (*Tolstoi, L.G., Levin, R.M. "Osteoporosis—The Treatment and Controversy," Nutrition Today Jul-Aug 1992;6-12*). The medical and social costs have been estimated to be over 6 billion dollars each year.

Osteoporosis is a very common condition that increases with age. 1.3 million people over 45-years of age experience hip, wrist, and spinal column fractures associated with osteoporosis, a condition of excessive bone mass reduction (*Nelson, M.E. et al, "A 1-Year Walking Program and Increased Dietary Calcium in the Postmenopausal Women: Effects on Bone," Am J of Clin Nutri May 1991;53(5):1304-1311*). It is found to be more common in women than in men and is more common in white and Asian people than in black populations. Nearly 1/3 of American women will, during their lifetime, develop osteoporosis severe enough to yield possible fractures (*Tolstoi & Levin, 1992*). The most common fractures occur in the hips, vertebrae, or wrists.

The standard American diet, which contains food grown on depleted soils, has left Americans deficient in many nutrients that are important to bone health. Crops are repeatedly raised on the same field year after year with only artificial fertilizer designed to increase yields but not nutritional content of foods.

As early as 1936, U.S. Senate Document 264 cited nutritional deficiencies caused by our depleted soils. It also stated that 95% of Americans were deficient in one or more major minerals and many trace minerals that have proved to be necessary for bone mineralization. One can only imagine how much more depletion has taken place since 1936. Contributing to this depletion, the standard American diet consisting of high sodium, high protein, high sugar, soft drinks, caffeinated beverages, and processed foods leads to further calcium loss (*Weed, S.M. Menopausal Years. New York: Ash Tree Publishing, 1992:22*); *Coats, C. "Negative Effects of a High Protein Diet," Family Practice Recertification Dec 1990; 12(12); 80-94*); *Thom, J.A., et al, "The Influence of Refined Carbohydrate on Urinary Calcium Excretion," Brit J of Urology Dec 1987; 50(7); 459-64*; *Heany, R.P., "Effects of Nitrogen, Phosphorous, and Caffeine on Calcium Balance in Women," J of Lab & Clin Med Jan 1982; 46-55*). This standard diet is reported to have an acidifying effect on metabolism, drawing calcium out of bone tissue to buffer these overly acidic conditions.

Supplementation of calcium with estrogen replacement has been only partially successful in the treatment of osteoporosis. Bone health may not only be dependent on calcium and estrogen, but also importantly dependent on a large combination of other nutrients, including vitamin B6, C, D, K, folic acid, as well as the minerals magnesium, manganese, boron, zinc, copper, strontium, silicon, and natural sources of progesterone.

Total Calcium was developed to be similar to the vitamin-mineral qualities of whole foods grown on rich soils with all necessary nutrients included for absorption and utilization by the body. Current literature on bone health, long-standing research on building healthy bone, and positive clinical results were paramount in the development of Total Calcium™.

Total Calcium, like other complete nutrient supplements, was designed to give the whole composite of proper nutrients to improve absorption and utilization of calcium and prevent calcium deficiency.

Recent literature suggests that a combination of nutrients is far more effective in balancing body nutrition, absorption, and utilization. In nature, you always find nutrients that act in concert with each other. Good, whole, natural organic foods contain vitamins, minerals, enzymes and other co-factors that support healthy metabolism.

Total Calcium is a synergistic blend of vitamins, minerals, and herbs. Bone is more than just a collection of inert calcium crystals. It is an active living tissue, constantly remodeling and rebuilding itself through osteoblastic (bone forming) and osteoclastic (bone resorption) activity. Bone lives in constant flux of biochemical change. Since bone is an active, living tissue, it has direct and constant need for a wide range of nutritional support.

Total Calcium is a synergistic combination of all nutrients presently known to help build strong and healthy bones.

**Vitamin D3 (as cholecalciferol)** is required for intestinal absorption of calcium. Factors that lower vitamin levels in the elderly include exposure to sunlight, decreased dietary intake, and malabsorption. Studies have shown that treatment of osteoporotic patients with D3 increased calcium absorption, improved calcium balance, and reduced bone loss. Many experts feel the RDA for Vitamin D is set too low, and that the elderly especially need a much higher intake of Vitamin D (*Epstein et al, 1982; Gallagher, Riggs, & DeLuca, 1979; "Two Studies Indicate Vitamin D," 1984*).

**Folate (as folic acid)** is important for bone metabolism, which seems to be related to its role in homocysteine metabolism. High homocysteine accumulation is common in American populations. Individuals with genetic homocysteine disorders show high homocysteine levels and the development of severe osteoporosis at an early age. It is thought that high homocysteine levels have an adverse effect on bone formation. Some current studies also suggest that menopause is associated with an increased requirement for folic acid. Some studies state that 80% of the population is deficient in folic acid. Tobacco smoking, drinking alcohol, and using oral contraceptives tend to promote folic acid deficiency.

**Contraindication:** doses exceeding 100 times the RDA have precipitated seizures in epilepsy when the persons used the anticonvulsant drug phenytoin (*Recommended Dietary Allowances, 10<sup>th</sup> Edition, and National Research Council. Washington, DC: National Academy Press 1989; 155*).

**Calcium (as chelate, hydroxyapatite)** is a form of calcium that is well absorbed. Research shows chelated forms of calcium to be absorbed ten times better than carbonate or oyster shell calcium. Chelated forms can be absorbed in environments of poor stomach acid as well (*Durance et al, 1973; Heany, 1993; Johnson et al, 1992*). Calcium Hydroxyapatite is a compound that has numerous advantages. It is well absorbed and useful in a nutritionally supplemented approach to osteoporosis. It is derived from bone and retains all of the bone minerals and organic residues in their natural physiological ratio. The organic components include collagen, mucopolysaccharides, and amino acids, plus glycosaminoglycans in their natural forms, with their natural trace minerals (*Epstein et al, 1982; Neilsen et al, 1978; Stellan et al, 1985; Stephen et al, 1989*).

**Magnesium (as chelate)** maintains a proper ratio between calcium and magnesium. Magnesium is the activator for the body's alkaline phosphatase enzyme. This enzyme is necessary for the formation of new bone. Magnesium is also necessary for 80% of other enzymatic functions in the body. Magnesium helps prevent the formation of kidney stones by increasing the solubility of calcium in the urine. The conversion of vitamin D to its biologically active forms needs magnesium, because a deficiency of magnesium can produce vitamin D resistance syndrome. (*Medalle, Waterhouse, & Hahn, 1976*).

**Zinc (as chelate)** is an essential nutrient for normal bone formation. It also enhances bio-chemical actions of vitamin D. Zinc levels have been shown to be low in elderly patients. Low serum zinc levels were also found in individuals with accelerated bone loss of the alveolar ridge of the mandible. Dietary surveys have shown that nearly 70% of adults consume less than 2/3's of the RDA for zinc. (*Frithiof et al, 1980*).

**Copper (as chelate)** In animal studies, copper deficient diets yielded reduced bone mineral content and reduced bone strength. On the other hand, copper supplementation was shown to inhibit bone re-absorption *in vitro*. Copper is a co-factor for the enzyme lysyl oxidase, which strengthens connective tissue only by cross-linking collagen strands. The standard American diet has been estimated only to take in approximately 50% of the RDA for copper (*Smith et al, 1985; Follis et al, 1955; Wilson, 1981*).

**Manganese (as chelate)** is necessary for bone mineralization and formation of chondroitin sulfates and other glycosaminoclycans (GAGS).

Signs of deficiency include abnormal formation of bone and cartilage (Mertz, W. ed. *Trace Elements in Human and Animal Nutrition, Vol. 1: Orlando, FL: Academic Press, 1987: 185-223*). Studies have shown women with osteoporosis have lower manganese levels than control groups.

**Ipriflavone** is an isoflavone derived from soy and rich in genistein, belonging to a larger class of naturally occurring molecules known as bioflavonoids. Ipriflavone has been shown to bind to estrogen receptors in bone tissue without exhibiting undesirable estrogenic effects. (Melis G.B et al., *J of Endocrinol Invest* 1992; 15: 755-761). Results of clinical studies examining the effects of Ipriflavone on bone density indicate a statistically significant increase in bone mass (Cheng S. L. et al, *Calcif Tissue Int* 1994; 51 (1):S11-S15). Isoflavone appears to inhibit bone loss through its effects on the activity of bone cells (Notoya, 1992; Notoya K. et al, *Calcif Tissue Int* 1993; 53: 206-209). Specialized bone cells called osteoblasts are responsible for building bone, while other bone cells known as osteoclasts break bone down. With increased age, the breakdown rate begins to exceed the rebuilding rate. For post-menopausal women, declining estrogen levels aggravate this imbalance of bone formation and breakdown even further. Several studies have demonstrated that Ipriflavone not only directly inhibits the activity of osteoclasts, helping prevent bone loss, but also promotes osteoblast activity, resulting in increased production of bone tissue proteins and beneficial calcification (Cheng, *Ibid*; Notoya, 1992). We recommend that all pre- and post-menopausal women eat a diet rich in soy foods as well.

**Wild Yam (root)** is an herbal phytonutrient rich in sterols that has demonstrated natural progesterone activity without such side effects of synthetic progestin as water retention and hypertension. Wild Yam has also been shown to have a mild estrogenic effect. John R. Lee, M.D., reported 15%-40% increases in bone mass with natural progesterone from wild yam (Lee, J. R. "Significance of molecular configuration specificity: The case of progesterone and osteoporosis," *Townsend LfD Jun* 1992;119: 558-562).

**Horsetail (herb)** is an herbal source of calcium and natural silica. High concentrations of silicon are found at calcification sites in growing bone. This mineral appears to strengthen connective tissue matrix by cross-linking collagen strands ("*Silicon and Bone Formulation*," 1980).

**Chlorophyll** contains natural vitamin K and is required to synthesize osteocalcin, a protein found uniquely and in large amounts in bone. Vitamin K has a role in osteocalcin production and is essential for bone formation, remodeling, and repair (Gallop, Lian, & Hanuschka, 1980).

**Strontium (as chelate)** occurs in relatively large concentrations in bone and teeth. It is thought to replace a small fraction of calcium in hydroxylapatite crystals. Non-radioactive strontium occurs naturally in food. It is not to be confused with radioactive strontium, a component caused by nuclear fallout. Studies have shown that natural strontium is safe even with long-term administration at doses hundreds of times greater than the usual dietary intake (McCaslin & Janes, 1959).

**Boron (as chelate)**, as demonstrated by current research, is very important for the formation of steroid hormones, including vitamin D and estrogen. Studies have shown women with osteoporosis, who supplemented with boron, reduced urinary calcium excretion over 40% and the serum estrogen levels increased. Boron deficiency has been shown to exacerbate signs of vitamin D deficiency, including abnormal bone formation and the elevation of alkaline phosphatase (Hunt & Nielson, 1982).

## MAJOR RISK FACTORS FOR OSTEOPOROSIS IN WOMEN

Postmenopausal	Family history of osteoporosis	High calcium intake
Inactivity	Long-term corticosteroid therapy	Smoking
White or Asian ethnicity	Short stature and small bones	High protein diet
Nulliparity (never pregnant)	Hyperparathyroidism	Alcohol use
Premature Menopause	Leanness	High refined sugar diet
Gastric or small-bowel resection	Hyperthyroidism	Long-term use of anticonvulsants
		Lead and/or cadmium accumulation

It is estimated that more than 20 million people in the United States are affected by osteoporosis. Aging is a factor that must be considered because bone loss accelerates after the age of 45, when women typically lose 5-10% of bone mass as their hormone levels undergo dramatic changes. Postmenopausal women have the greatest risk, with bone loss being the most prevalent at the hips, spine, and ribs.

A deficiency of several different nutrients can lead to osteoporosis or other calcium deficient conditions. A good approach to building strong and healthy bones would include adding Total Calcium™ to the diet, a calcium formula blended with all known synergistic factors helpful in promoting bone health, moderate exercise, and attention to diet. Such nutritionally oriented programs have been reported to help halt bone loss and restore bone mass. (Appleton, N. *Healthy Bones: What You Should Do About Osteoporosis*. Garden City Park, NY: Avery, 1991: 61-62; Pruitt, L.A., et al, "Weight Training Effects on Bone Mineral Density in Early Menopausal Women," *J of Bone & Mineral Research* Feb 1992; 7(2): 179-185; Wolfe, S.M. and the Public Citizen Health Research Group. *Women's Health Alert*. Reading, MA: Addison-Wesley Publishing Co, 1997: 124; *Alternative Medicine, The Definitive Guide*, compiled by The Burton Goldberg Group. Fife, Washington: Future Medicine Publishing, Inc. 1993-95; 773-781).

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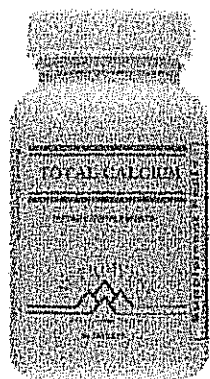
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**TOTAL CALCIUM**

(With Ipriflavone)

Comprehensive bone support is supplied by nature in microcrystalline hydroxyapatite form, combined with super support from additional ingredients.



Each Tablet Contains: Vitamin D3 (as cholecalciferol) 5 mcg, Folate (as folic acid) 150 mcg, Calcium (as chelate, hydroxyapatite) 100 mg, Magnesium (as chelate) 50 mg, Zinc (as chelate) 0.500 mg, Copper (as chelate) 0.500 mg, Manganese (as chelate) 0.260 mg. Proprietary blend 65.10 mg\* of: Ipriflavone, Wild Yam (root), Horsetail (herb), Chlorophyll, Strontium (as chelate), Boron (as chelate).

90 – Tablets per bottle                      2406A - Product order number

Contraindications: None Known



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