Building Bone Density & Preventing Osteoporosis

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Osteoporosis is a loss of normal bone density caused by loss of minerals and other substances from in the bones. This results in thinning, brittle bones, and occurs most frequently in women who have gone through menopause, patients who are inactive or paralyzed, and in patients taking steroid hormones. Osteoporosis may cause pain, especially in the lower back, frequent fractures (broken bones), loss of body height, and various badly formed parts of the body.

Medical treatment for osteoporosis

Particularly where postmenopausal women are concerned, estrogen replacement has been the mainstay of therapy for the prevention and treatment of osteoporosis. However, long-term compliance with estrogen therapy is often poor, and there are numerous concerns regarding its safety. Other medical treatment of osteoporosis includes calcium supplementation. In fact, calcium supplement sales are at an all-time high as women try to prevent bone loss. However, only a certain type of bone, the cortical bone, is primarily being strengthened from the added calcium intake. The trabecular bone loss where osteoporosis frequently occurs may not be as affected by calcium supplementation. Dr. Mark Hegsted, Professor of Nutrition at Harvard University, stated that "osteoporosis looks like a dietary problem, not a calcium problem." This means that there are a variety of nutrients and other dietary substances which are needed to fight osteoporosis. Following is a discussion of those nutrients and dietary substances.

Calcium

Calcium's role in the prevention and treatment of osteoporosis is so well established,[1] that it doesn't really require any extensive discussion here. There is, however, a value in discussing the role calcium *supplementation*, as well as the *types* of calcium, in the prevention and treatment of osteoporosis. To begin with, there is such a huge body of research regarding calcium supplementation for this purpose, that I can't begin to discuss individual studies. Instead, I'll discuss research over the past decade in which multiple studies on this subject are presented by review or meta-analysis (i.e., an analysis of many studies on the same subject).

Research overwhelmingly supports the use of calcium supplementation, alone or in combination with other therapies (e.g., vitamin D supplementation, hormone replacement therapy) for slowing or stopping the progression of osteoporosis.[2] As a matter of fact, FDA-approved therapy for the treatment of postmenopausal osteoporosis includes calcium and vitamin D supplementation.[3] This is especially significant since the FDA is not known for their warm, fuzzy feelings about dietary supplements. The bottom line is that calcium supplementation in doses of 1000-1500 mg daily has effectively slowed bone loss.[4 5 6 7]

As previously noted, osteoporosis can lead to an increased incidence of fractures. Research has clearly shown that calcium supplementation can help to reduce the risk, and even prevent fractures in osteoporosis.[8 9 10 11] As a matter of fact, one meta-analysis estimated that 134,764 hip fractures and $2.6 billion in direct medical costs could have been avoided in one year if individuals aged 50 years or up consumed approximately 1200 mg daily of supplemental calcium.[12]

Regarding the types of calcium, there are many effective options. Some research has found that approximately the same level of absorption can be had with various forms of calcium (including calcium citrate, calcium carbonate, hydroxyapatite, calcium gluconolactate and calcium pidolate)[13], while other research has shown that certain forms of calcium (such as calcium citrate) are better absorbed over other forms (such as calcium gluconolactate and

carbonate).[14 15 16] Still other research shows that even calcium carbonate (a relatively insoluble form of calcium) is fairly well absorbed when taken with a meal.[17] Then, there is hydroxyapatite (HA), a whole bone concentrate that provides calcium, phosphorus and a variety of other naturally occurring bone nutrients. Research indicates that women who use HA gain significant cortical bone thickness as compared to women who used calcium alone (as calcium gluconate).[18] With this apparently bewildering contradiction in research on different forms of calcium, how do you decide which form to use?

One good solution is to use a combination of different forms of calcium. Such combination products are readily available, and marketed by different dietary supplement companies. The advantage to this approach is simple. According to Hans Nieper, M.D, of the Silbersee Hospital, Hannover, West Germany, different forms of the same mineral (aspartates, ascorbates, etc.) are transported to different and specific absorption sites within the cell or cell membrane. For example, Dr. Nieper reports that mineral aspartates are transported to the inner layer of the outer cell membrane. Consequently, by using different forms of calcium, there is a greater potential to maximize overall calcium absorption and utilization through a variety of cellular calcium absorption sites.[19]

Magnesium

Magnesium also plays a well-established role in bone health. Consequently it is not surprising that people with osteoporosis were reported to be at high risk for magnesium malabsorption.[20] Furthermore, bone[21] and blood levels of magnesium have also been reported to be low in people with osteoporosis.[22] Research has shown that supplementing with magnesium was able to reduce indications of bone loss.[23] Other research has shown that supplementing with 250-750 mg magnesium daily also stopped bone loss and even increased bone mass in twenty-seven of thirty-one people with osteoporosis in a two-year study.[24] A good daily dose of magnesium is 400-600 mg.

Vitamin D

Vitamin D's role in calcium absorption is well established. Furthermore, double-blind research indicates that vitamin D supplementation reduces bone loss in women who consume insufficient amounts of dietary vitamin D from food.[25] Other research also supports the use of higher dose (700 IU daily) vitamin D supplementation, particularly as a way to reduce bone loss in women during winter and spring, when vitamin D levels are typically at their lowest.[26] Some research, however, is unclear on vitamin D's potential role in reducing osteoporosis risk,[27 28] and some report little if any benefit.[29] Vitamin D supplementation is likely to have the greatest benefit in those not receiving adequate dietary vitamin D, and/or those who don't obtain adequate exposure to sunlight. Appropriate dosage recommendations are 400–1000 IU daily.

Zinc

Low blood and bone levels of zinc have been reported in people with osteoporosis.[30] Also, research indicates that urinary loss of zinc may be high in people with osteoporosis.[31] Other research found that men consuming a good amount of zinc in their diet had almost half the risk of osteoporosis-related fractures compared with those consuming significantly less dietary zinc.[32] Furthermore, in one study the use of supplemental zinc with calcium was more effective than calcium supplementation by itself in protecting against the loss of bone densisty.[33] A good dose of zinc is 15-30 mg daily.

Conclusion

The individual use of the aforementioned nutrients and dietary substances may help to prevent or slow the progression of osteoporosis. The results are likely to be much greater if a combination of many or all of these substances are used concurrently. In addition, a lifestyle that includes some resistance-type exercise (e.g., weight-lifting), may also help to build bone density.

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