



Nutrition Nuggets



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Osteoporosis or Brittle Bones, Part I

Osteoporosis literally means “porous bones” and has been labeled a childhood disease with old age consequences. This is because building strong bones in youth helps prevent fragile bones in later years. Severe osteoporosis can cause back pain as a result of fractured or collapsed vertebrae, loss of height and a stooped posture.

Mineral content of bones typically declines gradually over many years and can eventually create serious bone loss. Frequently, a fracture occurs before an individual is aware that the disease is present. By this time, bone loss is advanced and damage may be irreversible.

Bone is living tissue that is constantly being renewed. Older bone is broken down and replaced by new bone cells. Up until adulthood, more bone tissue is created than removed and maximum mass is reached by the mid-30's. After that, calcium and phosphate from bone is lost a little more rapidly than it is replaced, so density slowly declines.

More Common in Women

At menopause, the sudden drop in estrogen levels results in an acceleration of demineralization as this hormone inhibits breakdown. Women are approximately five times more likely than men to develop brittle bones.

In previous years, many women chose to receive supplemental estrogen through hormone replacement therapy (HRT). However, in 2002 a large clinical trial called the Women's Health Initiative revealed several risks with HRT including cancer, heart disease and stroke. Today, estrogen replacement is rarely recommended.

Risk Factors

There are numerous dietary and lifestyle factors that contribute to risk of developing osteoporosis in middle or old age. Things we have some control over include:

- Cigarette smoking
- Alcohol consumption of more than two drinks a day
- Lack of physical activity
- Long-term use of steroid medications or (some) anticonvulsants

There are a few things we cannot change that are associated with increased risk. These include:

- Aging
- Being female
- Caucasian or Asian race
- Family history of osteoporosis

The Roles of Calcium and Protein

Adequate calcium intake during childhood and adolescence is essential to building healthy bones. Inadequate intake can prevent the attainment of peak bone mass during early adulthood. Although the importance of calcium to bone health is well-recognized, adequate intake alone is not enough to prevent bone loss. If it were, rates of osteoporosis in nations like ours where dairy products and calcium supplements are widely consumed would be very low.

The fact is, in Westernized nations bone demineralization is rampant. This is mainly due to the modern diet, high in animal protein and refined food. Most Americans consume at least twice their daily requirement for protein. Excess amino acids are converted in the body to organic acids, including sulphuric acid from the sulphur-containing amino acids like cysteine and methionine, concentrated in meat products.

Our blood pH must be kept within the narrow range of 7.35 to 7.45 – slightly more alkaline than water, in order to maintain normal cellular function. The body draws calcium phosphate out of bone to buffer any excess acid which would otherwise lead to organ failure. This process results in progressive erosion of the primary mineral of bones.

Four worldwide population surveys conducted by different teams over twenty years agree that the countries that consume the most calcium (United States, Western Europe, Australia, and New Zealand) have the highest rates of hip fracture. Additionally, no consistent link has ever been found between the amount of calcium people consume and protection against osteoporosis. People groups that consume little or no dairy products or calcium supplements (much of Asia and Africa) have fracture rates that are at least 50% lower than our national statistics.

When calcium is released from porous areas of bone, it eventually leaves the body through urine. Studies reveal that as protein in the diet increases, so does calcium in urine. This is how our modern diet increases risk for kidney stones, another food and lifestyle-related epidemic in America. (See [Reduce Your Risk for Kidney Stones](#), Nutrition Nuggets, January 2011.)

Plant Foods Protect

On the other hand, a diet that follows U.S. Dietary Guidelines' recommendation to "make half your plate fruit and vegetables" provides sufficient alkali to offset any acidifying foods. Alkaline salts of potassium occur naturally in produce. In the body, these are converted to bicarbonate which can preserve calcium in bones by buffering excess acid. Three servings of fruits and vegetables are necessary in order to buffer the amount of organic acid in one 3-ounce serving of animal protein. Two servings are required to neutralize the acidifying effect of a half-cup serving of grain.

Population studies reveal an inverse correlation - in countries where meat consumption is high, there exists a much lower intake of natural plant foods and vice versa. Not surprisingly, in those societies where animal foods predominate, incidence of bone loss and fractures are high. The connection between animal protein and osteoporotic fracture rates was first revealed in 1920 and has been re-documented numerous times in years since.

Although habitually excessive protein consumption is harmful, inadequate dietary protein appears to be worse. Several large population-based studies have shown that intakes of dietary protein significantly below the recommended amounts of 56 and 46 grams for men and women respectively are associated with more rapid bone mineral loss and increased fractures. In the U.S., those most at risk are the low-income elderly.

Resources

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