

# Bone Health

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Osteoporosis, a progressive loss of bone, has been recognized as a threat to the health and quality of life in mature adults - especially women, increasing their risk of fracture of the wrist, hip, or spine. The most important way to improve bone mineral density is to give your body the nutrition it needs. Of all the bone nutrients, Calcium, Magnesium, and Phosphorus are required in the largest amounts. However, they rely on other important vitamins and minerals for proper utilization in the bone.

## Calcium

Adults should consume 1,000 to 1,500 mg of calcium per day, divided into doses of no more than 600 mg per serving. In terms of absorption and elemental content, the preferred forms of calcium are citrate and microcrystalline hydroxyapatite (MCHC). Calcium citrate is excellently absorbed. MCHC is also very well absorbed and includes many factors important to bone health. MCHC has the additional benefit of supplying bone specific peptides, strontium, bone specific growth factors, type 1 collagen, and a full spectrum of trace minerals; all constituents important to maintaining and improving bone health.

## Magnesium

The recommended intake of magnesium - most effective in citrate or glycinate form - is generally 400 - 600 mg per day. Magnesium citrate tends to have a mild stool softening effect and magnesium glycinate lacks this effect. Calcium intake at higher dosage levels can compete for absorption with magnesium in the intestines. For this reason we generally suggest taking magnesium supplements 15 minutes before meals, and calcium supplements 15 minutes after meals, insuring an adequate interval between mineral ingestion. Also these two minerals should be supplemented in a biologically appropriate ratio (2:1 or 3:1, calcium to magnesium ratio).

## Phosphorus

Phosphorus is required in approximately the same amount as calcium. Some people fear the ingestion of too much phosphorus from food or supplements will actually degrade the bone. This fear is unfounded, as phosphorus absorption has a threshold beyond which any excess is excreted. However, when consumed in the form found in diet cola (phosphoric acid), the body must neutralize the added acidity, making calcium the body's buffer of choice.

## Vitamins D and K

Vitamin D and Vitamin K are also vital to bone metabolism. Vitamin D is needed to absorb calcium from the gut, and regulate synthesis of the bone protein osteocalcin. Vitamin K activates at least three proteins involved in bone health, including osteocalcin. It is important to note, the current recommended intake for vitamin K (80 mcg), may not be sufficient for all of vitamin Ks activities. According to recent studies, a greater intake of vitamin K is required to fulfill its function in bone mineralization.

## Trace Minerals

Trace minerals such as Silicon and Boron, despite relatively modest requirements, are equally important to bone health. Bone can be negatively affected by increased calcium excretion due to a diet high in sodium, combined with an insufficient intake of potassium. In addition, certain prescription medications, such as corticosteroids, increase bone loss. A reduction in the consumption of caffeine, phosphoric acid (as in cola), excessive alcohol, and cigarette smoking, may help decrease the risk of bone loss.

## Collagen

Calcium, magnesium, and other minerals and vitamins do not magically combine to create bone. They need a superstructure to rest on. This superstructure is made of type 2 collagen and its component glycosaminoglycans; type 2 collagen is a natural source of chondroitin(s) and keratin sulfate - essential components of both bone and joint tissue.

## Omega-3 Fatty Acids

Recent research shows that if there is an imbalance of omega-6 fatty acids (too much) with omega-3 fatty acids (too little) osteoporosis can still develop in the hips and possibly spine even with adequate intake of other nutrients and a healthy lifestyle.

**Beyond providing raw materials essential to bone health and eliminating unfavorable habits, the following strategies may help to enable your body utilize bone nutrients more efficiently:**

- \*Keep your diet rich in potassium, a calcium-sparing mineral. The body will use potassium as a buffer for acid-producing food rather than mobilizing calcium from the bones.
- \*Exercise regularly in weight-bearing or resistance-training- preferably both. In weight-bearing exercise, gravity and your body-weight provide the resistance, such as in walking, dancing, and jogging. In resistance exercise, such as weight-training, muscle pulls on the bone to move a workload.
- \*Soy isoflavones, beneficial to menopausal women, can bind to estrogen receptor sites on osteoblasts (bone-forming cells). Whereas estrogen primarily helps prevent the breakdown of bone, soy isoflavones assist in the formation of new bone.

In conclusion, the effectiveness of methods discussed in this article are dependent upon a constant intake and supply of the fundamental bone nutrients, along with a healthy lifestyle and good living habits no smoking, moderate alcohol consumption, regular exercise, and a healthy diet.