



Most people think of osteoporosis as an old woman's disease. Marked by hip fractures and the distinctive "dowager's hump," the statistics for osteoporosis are truly astounding. According to the International Osteoporosis Foundation, osteoporosis affects one in three women and one in five men over the age of 50. And it just becomes more serious with each passing decade. But while the signs of osteoporosis—you're not quite as tall as you used to be, you suffer from frequent back pain, and you're more prone to fractures—may not show up until your 60s or older, the disease actually begins much earlier. In fact, you can begin to lose more bone than your body can make by the time you celebrate your 40th birthday!

## Bone Basics

Although many people think of the skeleton as an unchanging structure, bones are living, growing tissues. Bone

consists of a strong, flexible mesh of collagen fibers (proteins that form a soft framework) and calcium phosphate (a mineral that hardens the framework). Throughout a person's lifetime, healthy new bone is added to the skeleton and old bone is removed, a process known as remodeling.

Bone remodeling involves two types of bone cells. Osteoblasts create new bone cells, while osteoclasts are responsible for removing old cells from the skeleton. This delicately balanced process is carefully regulated by many of the hormones and nutrients in our body such as estrogen, progesterone, calcium, and vitamin D.

When you are young, new bone is added faster than old bone is removed. As a result, bones become larger, stronger, and more dense until they reach peak bone mass. Peak bone mass tends to occur in your 30s. After this,

however, the bones lose increasing amounts of protein and minerals—more than they can build up. Over time, bones become thin and porous. When bones turn porous enough, they become vulnerable to fractures, even under the normal stresses of everyday living.

## Bad to the Bone

Once bone loss starts, a woman can lose one-half to one percent of her bone mass each year. After menopause, the rate of bone loss is even greater because of the abrupt drop in estrogen. During the decade after menopause, it's estimated that women lose up to three percent each year. As a result, many women will develop small fractures in their spine, causing pain and a shrinking in height.

Men also start to lose bone mass around age 40 (approximately three to five percent per decade). However, men

have approximately 30 percent more bone mass than women, thanks largely to the male hormone testosterone. As a result, their bones remain thicker and stronger far longer than those of women. This translates into considerably more osteoporosis-related fractures in women than in men. In fact, after menopause, bone loss in women accelerates so quickly that an average woman in her 70s has lost half her bone mass while a man of the same age suffers a loss of only 14 percent.

### Bone Builders

Fortunately, there's plenty you can do to bolster bone health when you're young and to slow bone loss in your later years, starting with your diet. Along with calcium-rich foods like full-fat dairy and leafy greens, research suggests that loading up on fruits and vegetables can provide

critical antioxidants that stimulate bone development. The effect is so pronounced that one tissue culture study found that the colorful polyphenols in fruits and vegetables stimulated osteoblast activity 20-fold while calcium alone only increased bone growth 6-fold.

Routinely participating in weight-bearing exercise like walking, dancing, or high-impact aerobics works your skeleton against gravity. Over time, this can help strengthen bones. The National Osteoporosis Foundation notes that resistance training using weights or your own body weight also helps protect against osteoporosis. Pairing these two

types of exercise not only enhances bone mineral density, it also helps to maintain muscle strength, coordination, and balance, which in turn helps to prevent falls and related fractures.

Supplements also play a key role in bone health. But don't think you can simply pop a calcium supplement and call it a day. Just like raising a child, maintaining strong bones takes a village (of nutrients). Here's what you need:

■ **Start with calcium.** About 99 percent of the calcium in your body can be found in the bones and teeth. Yet, as you age, hormonal shifts can pull calcium out of bones. Add in certain lifestyle habits and your bones may not be getting the calcium they need. But not all calcium supplements are effective. Calcium carbonate, the cheapest and most popular type of supplement is very poorly absorbed,

providing only about 10 percent absorption. Calcium citrate is 27 percent more absorbable. And calcium bisglycinate chelate has an even better rate of absorption at 40 percent. **Typical daily dose: 1,000 mg.**

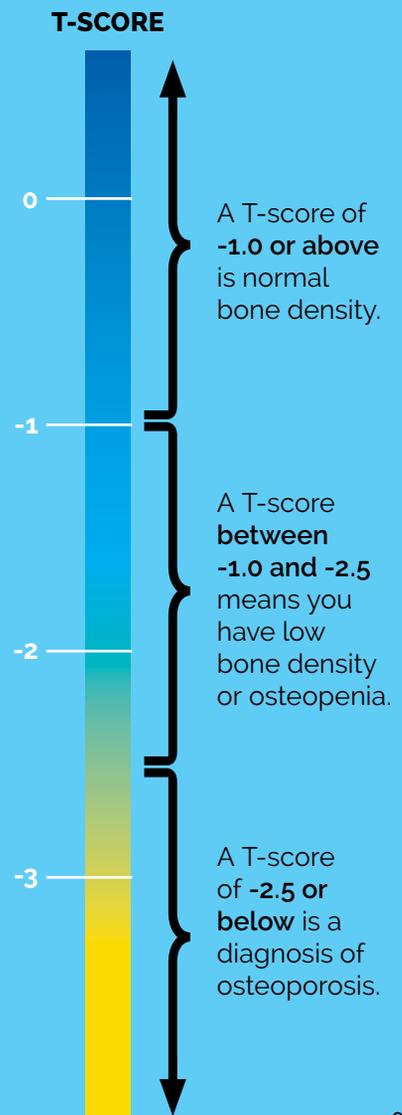
■ **Add in vitamin D.** Taking the sunshine vitamin not only boosts calcium absorption, it also helps maintain healthy blood levels of calcium and phosphorus. But opt for the D3 form of this fat-soluble nutrient instead of D2. Studies show that D3 is better at improving and maintaining vitamin D status in the body. **Typical daily dose: 2,000 IU.**



### Get Tested!

Approximately 34 million Americans over age 50 have thinning bones—a pre-osteoporosis condition called osteopenia. Osteopenia has no symptoms, but as bones get thinner, the risk of fracture increases. Without a bone density test, a broken hip may be your first clue that osteopenia has progressed to osteoporosis.

If you haven't had a bone density scan recently, ask your doctor to schedule you for one. The best way to check for osteopenia is with a test that uses dual-energy X-ray absorptiometry (DEXA). Bone density that's lower than normal may be diagnosed in either your hips or your spine. What does your score mean?



■ **Include magnesium.** A lack of magnesium may contribute to osteoporosis in several ways, including lowering the production of vitamin D. Magnesium also works with calcium to create osteoblasts that contribute to healthy bone mass. According to a recent study in the *European Journal of Epidemiology*, healthy magnesium levels may also reduce the risk of fracture. The best ratio of calcium to magnesium is 2:1. **Typical daily dose: 400-800 mg.**

■ **Kick up your vitamin K.** This fat-soluble vitamin modulates proteins involved in bone formation, and studies have linked a higher intake of vitamin K to fewer fractures. There are two types of vitamin K—K1 and K2. K1 aids in forming important proteins that promote bone growth and strength. K2 is important to the remodeling process. Make sure to take vitamin K with a meal containing some fat to enhance absorption. **Typical daily dose: 90 mcg of K1 and 45 mg of K2.**

■ **Bone up on boron.** Recent research reveals that boron is essential for the proper metabolism and utilization of the major bone nutrients—calcium, magnesium, and vitamin D. **Typical daily dose: 3-6 mg.**

■ **Manganese matters too.** This often overlooked mineral acts as a co-factor in the formation of bone cartilage and bone collagen, as well as in bone mineralization. **Typical daily dose: 2-5 mg.**

■ **Stronger bones with silica.** This mineral carries calcium into bones and prevents calcium from leaching out of bones. **Typical daily dose: 20-40 mg.**

■ **Strontium, an unsung bone builder.** Strontium strengthens bones by boosting the formation of healthy bone cells while also slowing down the removal of old bone cells. Just make sure you don't take it at the same time you take your calcium supplement. Both minerals use the same pathway in the intestinal tract, so taking them together can reduce the amount you'll absorb. **Typical daily dose: 680 mg.**

■ **Don't forget zinc.** Zinc is essential for healthy bone mineral density. Proper calcium absorption also depends on zinc. In addition, this trace mineral is critical for bone healing and increased amounts are found at the sites of bone repair. **Typical daily dose: 8-11 mg.**



### The Fosamax Fail

Bone-building pharmaceuticals called bisphosphonates (Fosamax, Boniva, Actonel, etc.) are often prescribed for osteoporosis. They work by slowing down the removal of old bone cells. Yet studies show that these drugs are ineffective when taken on a long-term basis. What's more, a recent study published in the journal *Nano Letters* found that bisphosphonates create abnormal bone formation and actually disrupt healthy bone remodeling. Adding insult to injury, other research shows that these drugs double the risk of esophageal cancer and the risk of vision loss, and cause a painful condition called osteonecrosis of the jaw. Fortunately, there are healthier alternatives for the prevention and treatment of osteoporosis.

## ARE YOU AT RISK?

### Uncontrollable Risk Factors:

- Being a woman
- Postmenopause
- Being Caucasian or Asian
- Having a small frame
- Family history

### Risk Factors You Can Control:

- Poor diet
- Lack of weight-bearing exercise
- Cigarette smoking
- Excessive alcohol or soda consumption
- Low vitamin D levels

While this list of nutrients may feel a bit exhaustive, you don't need handfuls of pills to keep your bones healthy. Comprehensive bone health supplements often include calcium, vitamins D and K, magnesium, manganese, boron, and zinc. Adding a supplement that provides 20 mg of plant-sourced silica can boost calcium absorption by 50 percent and also helps maintain an ideal calcium balance in bones. If you have been diagnosed with bone loss, consider adding strontium to the equation as well.

When it comes to keeping your skeleton strong, it's never too early to bone up on healthy habits. Remember, the healthier your bones, the more active you can be for a lifetime. ■