

OSTEOPOROSIS, WHAT YOU NEED TO KNOW

What it is, how you get it and how to prevent and treat it

By Devin Alaric Mikles, MD, MD(H), FACP

What is osteoporosis?

Like you, before the 1990's, no one else in the general public had ever heard of osteoporosis (porous bones). It would not surprise me to hear that many people thought that this was a new disease in humans. The truth is that it has probably been with some of us since the beginning of human life on the planet. However, before the advent of potential diagnostic tests and treatments for the disorder, no one paid much attention to it. It was largely considered a disease of older women, and since there was no good way to follow its progress and there was no available conventional drug treatment, many clinicians simply ignored it.

The primary feature of the osteoporosis process is the loss of bone mineral density leading to an increased risk of bone fracture in the spine, hip, arm and wrist. The major problems associated with fractures in osteoporotic bones are the accompanying potential for death due to immobility, malnutrition and pneumonia.

Who gets osteoporosis?

For 28 million Americans, Osteoporosis is a major public health threat. Eighty percent of those diagnosed with this problem are women. Ten million persons in the United States already have osteoporosis, and 18 million more have osteopenia (low bone mass not quite low enough to call it osteoporosis), which places them in a continuum at risk for this disease. Fifty percent of women and 12 percent of men 50 years old or older will have an osteoporosis-related fracture in their lifetime. About 2 million American men have osteoporosis, and millions more are at risk. Eighty thousand men per year suffer a hip fracture related to osteoporosis, and one third of these men die within a year of their injury.

There are approximately 1.5 million osteoporotic fractures annually, including 300,000 hip fractures, approximately 700,000 vertebral fractures, 250,000 wrist fractures, and more than 300,000 fractures at other sites. These fractures, particularly vertebral fractures, can be associated with disabling pain. The estimated national direct cost of treating (hospitals and nursing homes) osteoporosis and associated fractures was \$17 billion in 2001. That is \$47 million for every day.

What are the risk factors for getting osteoporosis

There are specific factors linked to the development of osteoporosis and these contribute to an individual's lifetime likelihood of developing the disease. Although many people with osteoporosis have several risk factors, others who develop osteoporosis may not have any identified risk factors.

Unmodifiable risk factors for osteoporosis include the following:

- *Gender:* The chances of developing osteoporosis are greater for women than men. Women have less bone tissue and lose bone more rapidly than men because of the changes involved in menopause, (either natural or surgical);

- *Age*: The risk of osteoporosis increases with age; bones become less dense and weaker with the aging process;
- *Body size*: Small, thin-boned women are at greater risk;
- *Ethnicity*: Caucasian and Asian women are at highest risk; African-American and Latino women have a lower but significant risk; and
- *Family history*: Susceptibility to fracture may be, in part, hereditary; those whose parents have a history of fractures also seem to have reduced bone mass and may be at risk for fractures. Heredity is the single biggest risk for this disease.

Modifiable risk factors for osteoporosis include the following:

- *Sex hormones*: Abnormal absence of menstrual periods (amenorrhea) and low estrogen levels (menopause) in women, and low testosterone levels in men;
- Anorexia;
- A lifetime diet low in calcium and vitamin D;
- Use of certain medications, such as glucocorticoids (steroids) or some anticonvulsants (drugs for seizures);
- An inactive lifestyle or extended bedrest;
- Cigarette smoking; and
- Excessive use of alcohol.
- Use of carbonated beverages with phosphoric acid (such as colas).

What are the symptoms of osteoporosis?

Since bone mineral loss is asymptomatic, osteoporosis is often called a "silent disease." We may not know that osteoporosis has started until bones become so weak that a sudden strain, bump, or fall causes a hip fracture or results in a collapsed vertebra. Collapsed vertebrae may initially be felt or seen in the form of severe back pain, loss of height, or spinal deformities such as kyphosis or severely stooped posture.

What kinds of screening or diagnostic tests are available?

If you are a woman over 65 years of age, the U.S. Preventive Services Task Force recommends routine screening for osteoporosis. Routine screening should begin at age 60 for those women identified as high risk based on a risk assessment.

The detection of osteoporosis should include a conventional medical assessment and measurement of bone mineral density (BMD). Some BMD tests measure bone density in the spine, wrist, and/or hip, while others measure bone density in the heel or hand.

The most accurate measure of BMD is dual-energy x-ray absorptiometry (DEXA) scanning with preference of the hip and spine. DEXA of the hip and spine (which can cost between \$125 and \$250 depending on whether it is performed in a physician office, outpatient imaging center or hospital) is the best predictor of hip and vertebral fractures. Bone density testing of the hand, wrist, forearm, and heel (which can cost between \$38 and \$100) also can be measured to detect risk but is not always diagnostic of real osteoporosis. The DEXA test is painless, noninvasive, and safe; it can be used to

- Detect low bone density before a fracture occurs;
- Confirm a diagnosis of osteoporosis if patients already have fractures;
- Predict the chances of fractures in the future; and
- Determine the rate of bone loss and/or monitor the effects of treatment if the test is conducted at intervals of a year or more.

Can osteoporosis be prevented?

Osteoporosis is generally preventable. Measures that can greatly reduce a person's risk of

developing osteoporosis are listed below. For someone that already has osteoporosis, these interventions can help prevent loss of bone mineral density.

Calcium Intake: An inadequate supply of calcium over the lifetime has been proven to contribute to the development of osteoporosis. Low calcium intake is associated with low bone mass, rapid bone loss, and high fracture rates. National nutrition surveys have shown that many persons consume less than half the amount of calcium recommended to build and maintain healthy bones.

Good sources of calcium include low fat dairy products, such as milk, yogurt, cheese and ice cream; dark green, leafy vegetables, such as broccoli, collard greens, bok choy, and spinach; sardines and salmon with bones; tofu; almonds; and foods fortified with calcium, such as orange juice, whole grain cereals and whole grain breads.

Calcium needs change during a person's lifetime. The body's demand for calcium is greater during childhood and adolescence, when the skeleton is growing rapidly, and during pregnancy and breastfeeding. Postmenopausal women and older men also need to consume more calcium. This may be caused by inadequate amounts of vitamin D, which is necessary for intestinal absorption of calcium. Also, as a person ages, their body becomes less efficient at absorbing calcium and other nutrients. Older adults also are more likely to have chronic medical problems and to use medications that may impair calcium absorption.

Persons aged 31 to 50 years should get 1000 mg of calcium each day in their diet. Persons over 50 years of age should get 1200 mg daily. All persons should make foods that are high in calcium a part of their diet. For example, an 8-ounce serving of milk or yogurt and an ounce of cheese supply 200 mg of calcium. Depending upon how much calcium a person gets each day from their diet; they may need to take a calcium supplement.

Calcium aspartate and calcium citrate are the best forms for calcium supplementation.

Supplements containing calcium carbonate must be taken with food to assure adequate absorption. Taking too much calcium can cause kidney problems and a daily limit of 2000 mg is recommended.

Magnesium Intake: Most conventional physicians are not aware that magnesium is another very important mineral in the maintenance of bone mineral density. In fact, scientific study has clearly demonstrated the profound negative effect of Magnesium depletion on bone mineral density. The current recommendation for magnesium intake is 50 to 100% of the calcium intake. Magnesium aspartate, citrate or glycinate are the best forms for magnesium supplementation. Daily use of magnesium oxide should be avoided as this can lead to lower bowel problems. Magnesium can cause loose stools or diarrhea in some individuals and so lower doses might be necessary in these persons.

Strontium, Boron and Silica Intake: Other minerals that have not generally been part of the recommendations for maintenance and improvement of BMD include strontium, boron and silica.

Vitamin D Intake: Vitamin D plays an important role in calcium absorption and in bone health. It is synthesized in the skin through exposure to sunlight. According to the NAS, persons aged 51 to 70 years should have 400 IU (international unit) of Vitamin D each day; those over 70 should have 600 IU daily. While many persons are able to obtain enough vitamin D from their diet, studies show that vitamin D production decreases in the elderly, in persons who are housebound, and during the winter. These individuals may require vitamin D supplementation to ensure a daily intake of between 400 to 800 IU of vitamin D. Massive doses of Vitamin D are not recommended; more than 2000 IU of vitamin D each day may cause harm to the liver and even lower bone mass.

Vitamin K:

Ipriflavones:

Exercise: Like muscle, bone is living tissue that responds to exercise by becoming stronger. The best exercise for the bones is weight-bearing exercise, which forces a person to work against gravity. These exercises include walking, hiking, jogging, stair-climbing, weight training, tennis, and dancing.

Medication Use: The long-term use of glucocorticoids can lead to a loss of bone density and fractures. Other forms of drug therapy that can cause bone loss include long-term treatment with certain antiseizure drugs, such as phenytoin and barbiturates; gonadotropin-releasing hormone (GnRH) analogs used to treat endometriosis; excessive use of aluminum-containing antacids; certain cancer treatments; and excessive thyroid hormone. In addition, various medications are available for the prevention and treatment of osteoporosis.

Fall Prevention: Falls are a special concern for men and women with osteoporosis. Falls can increase the likelihood of fracturing a bone in the hip, wrist, spine or other part of the skeleton. In addition to many environmental factors, falls can be caused by impaired vision and/or balance, chronic diseases that impair mental or physical functioning, and certain medications, such as sedatives and antidepressants. It is important that persons with osteoporosis be aware of any physical changes they may be experiencing that affect their balance or gait.

Smoking Cessation: Women who smoke have lower levels of estrogen compared to nonsmokers and frequently go through menopause earlier. Postmenopausal women who smoke may require higher doses of hormone replacement therapy and may have more side effects. Smokers also may absorb less calcium from their diets.

Alcohol Cessation: Regular consumption of 2 to 3 ounces a day of alcohol may be damaging to the skeleton, even in young women and men. Those who drink heavily are more prone to bone loss and fractures, both because of poor nutrition as well as increased risk of falling.