

Osteoporosis

Understanding Weakening Of Bone,
Its Prevention And Treatments



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The Arthritis Foundation gratefully acknowledges Lenore Buckley, MD, MPH, Medical College of Virginia, Richmond; Julie D'Agostino, APS, CS, Evanston Northwestern Health Care, Evanston, Ill., and William Rainey Harper College, Palatine, Ill.; Kenneth Saag, MD, University of Alabama, Birmingham; and Jennifer Trizuto, BSPT, MPT, Mills Health Center, San Mateo, Calif., for their assistance with this booklet.

This brochure has been reviewed by the



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Cover Illustrations: Stephanie Carter

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What Is Osteoporosis?

Osteoporosis (ah-stee-oh-po-RO-sis) is a disease that causes bones to weaken. This can lead to rounded shoulders, loss of height and even increased risk of fractures (broken bones).

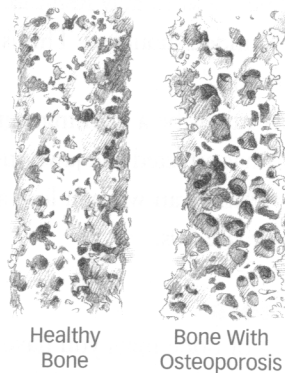
Osteoporosis itself is painless but the fractures that can occur because of it are painful. The word osteoporosis means bone (*osteo*) that is porous or filled with holes (*porosis*).

Osteoporosis is not the same as osteoarthritis (ah-stee-oh-ar-THRY-tis), or OA. OA is a common form of arthritis that affects the joints. In OA, cartilage that covers the joint breaks down, causing pain and stiffness. In osteoporosis, the bones become weak.

Osteoporosis is a serious health problem in the United States. It affects about 28 million people and results in more than 1.5 million fractures of the back, wrists and hips each year. Eighty percent of people with osteoporosis are women. It is the main cause of bone fractures in postmenopausal women and the elderly. You are more at risk for osteoporosis if you have a condition such as rheumatoid arthritis (ROO-ma-toyd ar-THRY-tis) or lupus, or if you take corticosteroid medications, such as prednisone.

Bone is a changing, living tissue. It is a structure filled with calcium and other mineral deposits. During a lifetime, bone is broken down and replaced with strong, new bone. Up until ages 20 to 25, the calcium you get from food helps bone rebuild faster than it breaks down. When your bones are the strongest and reach the highest density they'll ever be, it is called peak bone mass. This usually happens by between ages 25 to 30.

By around age 40, bone mass begins to decline slowly. During and after menopause, women lose bone mass at a faster rate because



Osteoporosis makes bones less dense and more susceptible to fractures

of a drop in estrogen levels. Over the next five to 10 years, women can lose up to one-third of their bone mass. This is because bone breaks down faster than it can be replaced. Men also lose bone mass as they age. However, women are at greater risk of losing bone mass than men. Women also have about 30 percent less bone mass than men when both have peak bone mass.

OSTEOPENIA

The word osteopenia is used to describe bone mass that is lower than usually seen in young adults but not low enough to significantly increase fracture risk. Most people with osteopenia do not need drug treatment unless there are special risk factors.

Bones that have less mass are more likely to break or fracture, even in a minor fall. In many people, the first warning sign of osteoporosis may be a broken bone. This is why osteoporosis is called a silent disease. However, bone loss occurs long before you

have a fracture. Early detection and treatment are important because the chance of future fractures increases greatly after the first fracture. Spine fractures may result in a loss of height and rounded shoulders. This is called a "dowager's hump."

Tooth loss might be a warning sign that osteoporosis has affected the jawbone. About one-third of American women lose all their teeth by their late 60s.

Risk Factors

The amount of bone mass you have as a young adult and the rate at which you lose it as you age determine your risk for osteoporosis. It is more common in:

- Women, especially those past menopause
- Women who go through menopause early (before age 45) or who have very irregular menstrual periods
- People with thin or small frames
- People with a family history of osteoporosis
- People with a history of bone fractures after minor trauma (fractures that occur without a serious accident, such as falling)
- People with an inflammatory form of arthritis, such as rheumatoid arthritis or lupus (see page 5)
- People who take drugs that reduce bone strength such as corticosteroids, anticonvulsants (seizure medications) or heparin
- People who eat few calcium-rich foods, such as dairy foods

- Smokers
- People who drink more than two alcoholic beverages a day
- People with a history of anorexia nervosa
- People who don't exercise regularly
- Men with low levels of testosterone

If you have one or more of these risk factors, you are at greater risk of having osteoporosis and of breaking a bone. Talk to your doctor about ways to reduce your risk and about whether you should have your bone density tested.

Inflammatory Arthritis and Osteoporosis

Inflammatory arthritis is a form of arthritis that causes inflammation in the lining of the joints and/or other internal organs. Having an inflammatory form of arthritis, such as rheumatoid arthritis or lupus, leads to the production of substances that cause bone loss. This bone loss increases your risk of developing osteoporosis. The risks may be magnified because people with inflammatory arthritis:

- Are typically women
- May not exercise regularly
- May use corticosteroid medications

Each of these factors increases the risk of osteoporosis.

Corticosteroids and Osteoporosis

People who take corticosteroids are at greater risk for osteoporosis. Corticosteroids (cortisone, prednisone) are powerful anti-inflam-

matory drugs used to treat some forms of arthritis. Corticosteroids may cause bone loss and are the most common cause of drug-related osteoporosis. The amount of bone loss depends on the amount of medication and how long a person takes it.

For example, a dose of prednisone higher than 5 milligrams (mg) per day over several years can result in bone loss and an increased risk of fractures. Recent studies suggest that doses of prednisone of 5 mg or less may be associated with bone loss in some people. However, short-term treatments with prednisone (1 to 2 months) once or twice a year or a very low dose (1 to 4 mg per day) are less harmful to bone.

Corticosteroids damage bone by increasing bone loss and decreasing new bone formation. They also decrease calcium absorption, and lower estrogen and testosterone levels.

If you take corticosteroids regularly, you should have regular bone-density tests to determine your bone strength and how much you are losing. You also should be tested for any other causes of bone loss that can be avoided. Talk to your doctor about osteoporosis prevention.

How To Prevent Osteoporosis

The keys to preventing osteoporosis are building strong bone and preventing bone loss. Before age 35, you can take the following steps to build as much bone mass as possible and help lessen the impact of bone loss later in life.

Increase Your Calcium and Vitamin D Intake

A healthful diet is important in preventing osteoporosis. Calcium intake is important to prevent bone loss. Calcium intake not only affects bone density, but it also affects other body processes. Your body must have a certain level of calcium in your blood for muscle contraction, heartbeat and normal blood clotting. Because these functions take priority over calcium's role in bone density, the body draws calcium from the bones to keep blood levels normal when calcium intake isn't enough.

How much calcium you need depends on your sex, age and risk for osteoporosis. Most adults need 1,200 to 1,500 mg of calcium per day. Unfortunately, most women only get about half that amount from their diets. Getting enough calcium is especially important if you're a woman under age 35. This is because your body is still able to absorb and store calcium in your bones easily. Doctors recommend 1,500 mg per day for teenagers and pregnant or breast-feeding women.

A high amount of calcium supplementation (1,500 mg) is also suggested after menopause for women who are not taking estrogen supplements and for people who are taking corticosteroids.

Getting 400 to 800 IU (international units) of vitamin D daily also is important. Corticosteroid users and the elderly should increase their intake to 800 IU. Vitamin D increases the amount of calcium your body absorbs from your intestines. Your body produces vitamin D when exposed to sunlight. Good sources of vitamin D include:

- Liver
- Fish oil
- Vitamin D-fortified milk
- Multivitamin/mineral supplements

If you do not like or cannot eat dairy or calcium enriched foods, calcium supplements can make up for the calcium you don't get from food. Calcium supplements come in tablets, liquid or chews.

There are different kinds of supplements. Calcium carbonate supplements contain the highest amount of useful, or elemental, calcium. You can increase calcium absorption by taking the calcium carbonate supplements with meals.

Calcium citrate and calcium gluconate supplements have less elemental calcium but may be easier for your body to absorb. They may be taken with or without meals. Be sure to take calcium supplements with meals and drink six to eight glasses of water each day. Talk to your doctor about which supplement is best for you.

FOODS AS CALCIUM SOURCES

Foods are the best sources of calcium. You can increase the amount of calcium in your diet by eating more dairy products. Milk, cheese and yogurt have the highest amounts of calcium. An eight-ounce glass of milk has about 300 mg. This is one-fourth of your daily calcium requirement. To avoid adding fat and calories to your diet, buy skim or low-fat dairy products that provide the same amounts of calcium as whole milk products.

If you are lactose intolerant, try lactase-treated dairy products. They will give you the same daily

requirement of calcium. Other beverages, such as orange juice, can be fortified with calcium.

GOOD SOURCES OF CALCIUM

Other foods that contain calcium include:

- Dark green, leafy vegetables, such as turnip greens, kale and collards
- Sardines with the bones
- Brazil nuts
- Calcium-treated tofu (isoflavones found in tofu and other soy food might help fight bone loss)
- Almonds
- Calcium-fortified orange juice, breads and breakfast cereals

Avoid Smoking

People who smoke have a greater risk of fracture than nonsmokers. Smoking reduces bone mass several ways. Calcium absorption is reduced in smokers. Women who smoke usually experience menopause at an earlier age, and smoking lowers women's estrogen levels.

Avoid Heavy Alcohol Use

People who drink large amounts of alcohol have a higher risk of developing osteoporosis. This is because they have less bone mass and lose bone more quickly. This loss of bone mass may be the result of alcohol's effect on bone. Drinking also increases the chances of falling and breaking a bone.

If you drink alcohol, experts recommend no more than two alcoholic beverages per day to keep bones healthy. One alcoholic drink is equal to 12 ounces of beer, five ounces of wine or one-and-a-half ounces of liquor.

Exercise and Stay Active

Exercises or physical activity that place weight on your bones or increase the resistive force against them can help you maintain bone mass. Weight-bearing and resistive exercises can strengthen bones in young adults. They also can maintain bone mass in middle-aged people. These activities include weight training (muscle strengthening) activities, dancing, cross-country skiing, stair climbing and walking.

Exercise also helps you move more easily and keep your balance, which helps you avoid falls. Exercise classes are an excellent way to work on balance and muscle strengthening.

One example is a form of exercise called tai chi, which emphasizes balance training and may be helpful in preventing falls.

To gain the health benefits of exercise, do some type of weight-bearing and resistive exercise for 30 minutes most days of the week. You can exercise 10 or 15 minutes at a time if you have trouble doing it all at once. Check with your doctor before starting an exercise program.

Osteoporosis Diagnosis

Since osteoporosis doesn't cause any symptoms, you may not even be aware you have it until you break a bone, notice a loss in height, or find that your upper back bends forward.

However, your doctor can determine if you have osteoporosis or are at risk of developing it. He or she will ask you questions about your medical history, including your overall health, medications, fractures, diet and family history.

You may need a physical examination and blood and urine tests to rule out other diseases that weaken bones.

If you are at risk of developing osteoporosis, or already show signs of the disease, your doctor may suggest a bone-density test. This test is the best way to measure bone mass.

It can also help you and your doctor evaluate the need for preventive measures and treatment. Bone density tests should be done in people who:

- Are taking corticosteroids
- Are women age 60 or over, and not taking bone-protecting medication
- Have a history or family history of fractures
- Have diseases that affect calcium absorption or bone strength

Bone-density tests may be recommended for some women as early as 50 if they are at high risk for osteoarthritis.

Bone measurement is a quick and painless test. The most accurate of these tests is done with a tool called a bone densitometer, which uses **dual-energy X-ray absorptiometry** (DXA). The DXA scan can measure as little as 1 percent to 2 percent loss of bone density. The DXA scan also is used to follow changes in bone density over time and with treatment.

X-rays of the bones help show fractures. However, X-rays are not accurate in determining bone density because 30 percent or more of the bone must be lost before the X-ray shows it clearly. Special **CT scans** also can measure bone density.

Some doctors have special training and experience that helps them diagnose and treat people with osteoporosis. These doctors include:

- **Rheumatologists** (ROO-ma-tall-o-jists) specialize in treating people with arthritis and related diseases.
- **Endocrinologists** (en-do-krin-all-o-jists) specialize in treating diseases of the body's endocrine system (glands and hormones) that can include osteoporosis.
- **Orthopaedic surgeons** (or-tho-PEE-dik sir-jins) treat osteoporosis fractures.

Some general internists, radiologists, orthopaedists and specialists in women's health also have special training in bone density measurement.

Osteoporosis Treatment

Many of the steps you can take to prevent osteoporosis also can help treat it. You should learn about the risks and benefits of potential treatments. Consider your age, health factors and personal preferences when comparing treatments. Talk about them with your doctor.

Medications

Bisphosphonates are now the most common treatment prescribed by doctors for osteoarthritis. They are compounds that can slow the loss of bone from osteoporosis, restore bone density and improve bone strength. Bisphosphonates are not hormones, so women who cannot take estrogen can use them.

Alendronate (*Fosamax*), risendronate (*Actonel*), and ibandronate (*Boniva*) are drugs approved by the FDA for the treatment and/or prevention of post-menopausal osteoporosis. Alendronate and risendronate have also been

FDA-approved for the treatment of corticosteroid-induced osteoporosis. These drugs decrease bone loss by binding to bone and preventing bone cells (called osteoclasts) from reabsorbing bone. Bisphosphonates can reverse bone loss and help reduce the risk of fractures by about 50 percent. They also prevent bone loss during corticosteroid treatment.

Until recently, hormone replacement therapy (HRT) was the traditional way to prevent osteoporosis but recent evidence suggests estrogen supplementation can increase the risk of breast cancer, strokes and heart attacks. Because of this, estrogen supplementation after menopause is usually not used to prevent osteoporosis.

However, selective estrogen receptor modulators (SERMs) are drugs that work like estrogen, but with fewer side effects. Raloxifene (*Evista*) is the first SERM FDA-approved for the treatment and prevention of post-menopausal osteoporosis. Raloxifene can prevent bone loss in the spine, hip and total body and has been shown to decrease the rate of spine fractures. It also produces small increases in bone mass and can lower the risk of breast cancer.

Teriparatide (*Forteo*) is a form of parathyroid hormone that is now FDA-approved for treatment of severe osteoporosis and fractures. It has been shown to stimulate bone formation and decrease the risk of spinal fractures and to improve bone density.

Calcitonin is a naturally occurring hormone that decreases bone absorption. It has been FDA-approved for osteoporosis treatment, not prevention. It is not considered as strong as the bisphosphonate medications in

preventing fractures. It controls bone breakdown and may relieve pain in people with spine fractures or compression of the spine. It is available as an injection (*Calcimar*) and a nasal spray (*Miacalcin*, *Fortical*).

When fractures occur, treatment may include casts, braces or surgery. Physical therapy, exercise, pain relievers and rest are important for proper recovery from a fracture.

Treatments Under Study

Several treatments for osteoporosis currently are under study. Some treatments are already used in other countries but have not yet been approved by the FDA to treat osteoporosis in the United States.

Your doctor is the best guide to finding the right treatment and helping you understand its risks and benefits.

Preventing Falls

As you get older, you may experience some changes that increase your chances of falling and breaking a bone. These changes include:

- Weakness from muscle loss
- Poor eyesight
- Dizziness caused by illness or medications

Even a minor fall can break a bone that is already weak from osteoporosis. Consider wearing hip protectors, which are light cloth underclothing with special padding over the hips. Hip protectors can reduce the chance of having a fracture if you fall.

Regular exercise and wearing low-heeled shoes with non-slip soles can reduce your risk

of falling. Be sure to get regular eye exams and wear glasses or contacts if you need them. Ask your doctor if you are taking any medications that might cause dizziness.

The tips below are ways to make your home safer. This will decrease your chances of falling.

LIGHTS

- Keep hallways, stairs and rooms well lit.
- Install nightlights where needed.
- Keep a flashlight beside your bed. Use it if you get up during the night.

STAIRS

- Install light switches at the top and bottom of stairways.
- Cover stairs with a nonslip surface.
- Install and use sturdy handrails.

BATHROOM

- Install handrails beside the bathtub and toilet, and in the shower.
- Use a rubber mat or rubberized decals in the bathtub to prevent slipping.
- Install a grab bar in the shower.
- Use a shower seat if you feel insecure about standing in the shower or getting in or out of the bathtub.

GENERAL

- Remove small throw rugs in kitchens or bathrooms to avoid tripping.
- Ensure that all large area rugs have anti-slip texture underneath.
- Be careful around your small animals if they get overexcited as they might cause you to trip.

Research

Since 1948, the Arthritis Foundation has invested more than \$370 million on research to help prevent, control and cure arthritis and related conditions.

Recently funded studies are examining the link between corticosteroid use to treat arthritis and the increased risk of osteoporosis. They are focused on finding the causes of drug-related osteoporosis in an effort to develop ways to stop bone loss. Other studies are also underway to evaluate how best to promote osteoporosis awareness, prevention and good patient-doctor communication.

For More Information

You also may contact the following organization for more information about osteoporosis:

National Osteoporosis Foundation

1232 22nd Street N.W.

Washington, D.C. 20037

202-223-2226

www.nof.org

The Arthritis Foundation

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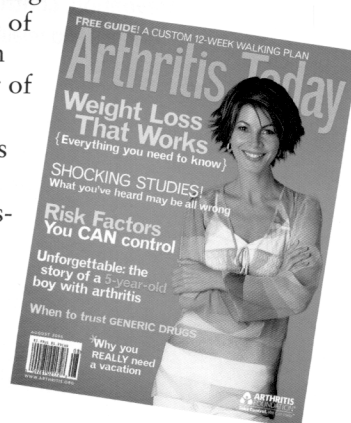
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