

PATIENT EDUCATION



The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

Osteoporosis

Throughout life, bones go through a constant process of loss and regrowth. As a person ages, more bone loss occurs than growth, the quality of bone declines, and the structure of the bones weakens. These changes can lead to a condition known as **osteoporosis**. Osteoporosis occurs five times more often in women than in men. Several types of medication are available to treat osteoporosis. Prevention also may be possible by recognizing risk factors and keeping bones healthy throughout each stage of life.

This pamphlet explains

- *how bones change throughout life*
- *the effects of osteoporosis*
- *risk factors for osteoporosis*
- *symptoms*
- *diagnosis*
- *treatment and prevention*

How Bones Change Throughout Life

Bones are made up of protein, **collagen**, and **calcium**, which give bones their strength. There are two types of bone—compact bone and spongy bone. Each bone in the body contains some of each type. Compact bone is found on the outer part of bones and is solid and hard. Spongy bone is found inside bones and is filled with tiny holes, just like a sponge.

Bones are constantly changing throughout life. Old bone is removed in a process called resorption. New

bone is built in a process called formation. During adolescence, bone is formed faster than it is broken down. The amount of bone in the body (sometimes called the “bone mass”) reaches its peak during the late teen years. During early adulthood, the amount of bone formed is about equal to the amount of bone broken down. In midlife, the process begins to reverse: bone is broken down faster than it is made.

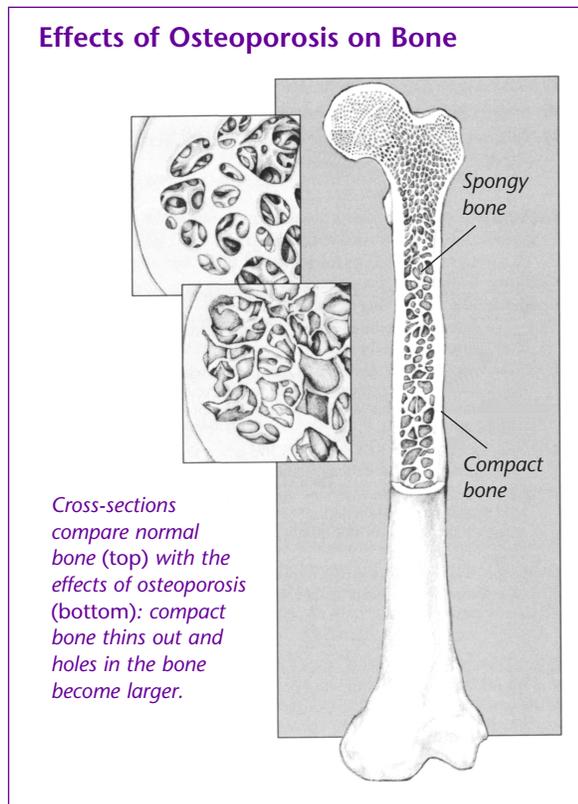
Effects of Osteoporosis

Osteoporosis means “porous bone.” In osteoporosis, the outside walls of compact bone become thinner, and the holes in spongy bone become larger. The first signs of osteoporosis are seen in bones that have a lot of spongy bone, such as the spine, hip, and wrist. The bones become weaker and more fragile. These changes lead to an increased risk of fractures. Fractures can greatly affect a person’s quality of life, especially for the elderly. Fractures can lead to disability and have been linked to an increased risk of death.

Risk Factors

The following lifestyle factors cause or contribute to osteoporosis and fractures:

- Low calcium intake
- Vitamin D insufficiency
- Excess vitamin A
- High caffeine intake
- High salt intake
- Aluminum (in antacids)
- Alcohol (three or more drinks per day)
- Not getting enough physical activity or being immobile
- Smoking (including secondhand smoke)
- Falling
- Being thin



Estrogen, a female **hormone**, plays an important role in bone health. Estrogen is made by the **ovaries**. Among its other functions, estrogen protects against bone loss. After **menopause**, the ovaries produce very little estrogen. This decrease in estrogen triggers a period of rapid bone loss in women that starts 1 year before the final menstrual period and lasts for about 3 years. The natural effects of aging on bones may contribute to this bone loss as well.

Getting enough vitamin D and calcium is especially important in keeping bones healthy. Low levels of vitamin D and calcium can lead to problems with bone formation and bone quality.

In addition to lifestyle factors, certain medications, including some types of **corticosteroids**, antiseizure drugs, **gonadotropin-releasing hormone agonists** (used to treat **endometriosis** and other gynecologic disorders), depot medroxyprogesterone acetate (the medication found in the birth control shot), and some drugs used to treat cancer, may increase the risk of osteoporosis. Medical conditions, such as **rheumatoid arthritis (RA)**, **lupus**, **diabetes mellitus**, and **inflammatory bowel disease**, have been linked to an increased risk of osteoporosis.

Symptoms

Osteoporosis may not cause any symptoms for decades. However, some signs and symptoms do occur as the disease progresses. As the spinal bones (**vertebrae**) weaken, they can fracture. Fracture in the front part of the spinal bones can result in loss of height or a slight curving of the spine. This type of spinal fracture often causes no pain. Sometimes, fractures of the spine can cause pain that travels from the back to the sides of the body.

Diagnosis

All women aged 65 years or older should have a bone mineral density (BMD) test. In a BMD test, bone density is measured at the heel, spine, hip, hand, or wrist. Women who are younger than 65 years and past menopause should have a BMD test if they have had a bone fracture because of fragile bones or have other risk factors for osteoporosis, such as rheumatoid arthritis, smoking, alcoholism, a history of hip fracture in a parent, or a body weight less than 127 pounds.

The most common method for measuring BMD is a DEXA scan. During a DEXA scan, you lie down for 3–10 minutes while a machine scans your body. With this test you are exposed to a small amount of radiation—less than the amount in a normal chest X-ray.

After the test, a T-score is given for each site measured (usually hip and spine). A negative score means that you have thinner bones than an average 30-year-old woman. A positive score means that you have stronger bones than an average 30-year-old woman. If the T-score at any site is -1 to -2.5, you have a low BMD and are at increased risk of osteoporosis. A score of -2.5 or lower means that you have osteoporosis. Treatment usually is recommended to prevent fractures.

How often you should have your BMD measured depends on your age and results of your previous DEXA scan. Women 65 years and older with normal bone mass or mild bone loss can have a test every 15 years. More frequent testing is recommended for women in this age group with T-scores between -1.5 and -2.49.

Another tool used to estimate fracture risk is called FRAX. FRAX is a computer program that helps predict the risk of having a fracture within the next 10 years in women aged 40 years and older who are not taking prescription osteoporosis drugs. It takes into account your age, sex, **body mass index (BMI)**, smoking, alcohol intake, and other risk factors for osteoporosis. Treatment is recommended if FRAX shows that you have a 3% risk of hip fracture; a 20% risk of a major osteoporotic fracture (fracture of the forearm, shoulder, or spine); or both. FRAX also is used to decide whether women younger than 65 years should have a DEXA test.

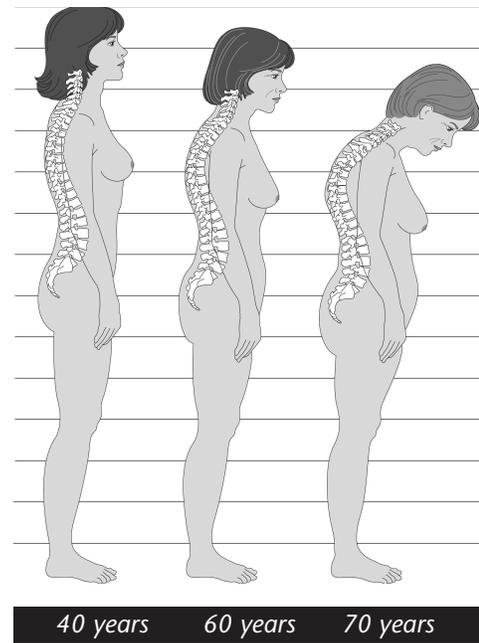
Treatment and Prevention

Various medications are used to treat osteoporosis and help reduce the risk of fractures. Some can be used for prevention. Lifestyle also plays a key role in preventing osteoporosis. Exercise, a healthy diet, and not smoking can help keep your bones strong and healthy throughout your life.

Medications

Osteoporosis medications differ in how they work, how they are taken, and how often they are taken. They can be given by mouth, with an injection, intravenously

Osteoporosis of the Spine



(IV), in a nasal spray, or in a skin patch. Some are taken daily; others are taken monthly, yearly, or a few times a year (Table 1).

DEXA testing is used to monitor treatment. A DEXA test may be given 1–2 years after starting treatment. It

Table 1. Drugs Used for Treatment and Prevention of Osteoporosis

<i>Name of Drug</i>	<i>Used for Treatment or Prevention</i>	<i>How It Works</i>	<i>How It Is Given</i>
Bisphosphonates	Treatment, prevention, or both	Prevents resorption of bone	<ul style="list-style-type: none"> • A tablet taken by mouth daily, weekly, for a few days a month, or monthly • Intravenously yearly or a few times a year
Denosumab	Treatment	Prevents resorption of bone	Injection every 6 months
Calcitonin	Treatment for women 5 years after menopause	Prevents resorption of bone and promotes formation of new bone	<ul style="list-style-type: none"> • Nasal spray daily • Injection every other day
Raloxifene	Treatment and prevention	Prevents resorption of bone	A tablet taken by mouth daily
Hormone therapy	Prevention in postmenopausal women	Prevents resorption of bone	<ul style="list-style-type: none"> • A tablet or tablets taken by mouth daily or for a few days a month • Skin patch applied weekly or twice weekly

usually takes at least 18 months of treatment to see an improvement in the DEXA score.

Lifestyle Factors in Preventing Osteoporosis

It is never too early to start thinking about bone health. Focus on building and keeping as much bone as you can through exercise, good nutrition, and staying healthy. If you are at risk of osteoporosis, these factors are even more important, especially as you approach *menopause*. Additional recommendations if you are at risk of osteoporosis include stopping smoking and avoiding secondhand smoke, reducing alcohol intake, and taking steps to prevent falls (see box).

Exercise. Exercise increases bone mass before menopause and slows bone loss after menopause. Bone is living tissue and exercise makes it grow stronger. The Centers for Disease Control and Prevention recommend that healthy adults get 150 minutes of exercise a week, which works out to be about 30 minutes on most days of the week.

Weight-bearing exercises can help keep bones strong. Weight-bearing exercises are activities that are performed while standing and that require your muscles and bones to work against gravity. An example is brisk walking. Non-weight-bearing exercises, such as Tai Chi, Yoga, and Pilates, can build endurance and improve balance and posture, thereby reducing your risk of falls.

Strength training also is good for bones. In this type of exercise, muscles and bones are strengthened by resisting against weight, such as your own body, an exercise band, or handheld weights.

If you have questions about exercise, talk with your health care professional or a physical therapist. They can give you advice about an effective and safe exercise program.

Preventing Falls

Follow these tips for preventing falls:

- Remove throw rugs or use rugs with nonskid backing.
- Eliminate clutter from the floor.
- Move cords and cables away from high-traffic areas.
- Use nonskid wax on hardwood floors.
- Secure indoor carpeting.
- Make sure rooms are well lit and use a night light.
- Use handrails by stairs and in the bathroom.
- Store items at a height that does not require a step stool.
- Check and correct (if needed) vision and balance problems.
- Review medications for side effects that may affect balance and stability.

Table 2. Recommended Daily Amounts of Calcium and Vitamin D for Women by Age

Age	Calcium Recommended Daily Amount (mg)	Vitamin D Recommended Daily Amount (IU)
9–18 years	1,300	600
19–50 years	1,000	600
51–70 years	1,200	600
71 years and older	1,200	800

Source: Institute of Medicine. Report Brief: Dietary Reference Intakes for Calcium and Vitamin D. November 2010. Washington, DC: National Academy of Sciences, 2011.

mg = milligram

IU = International unit

Calcium and Vitamin D. Calcium is important to building and maintaining healthy bones. Vitamin D helps the body absorb calcium. How much calcium and vitamin D you need depends on your age (Table 2).

Many people do not get enough calcium from food. To increase your daily levels of calcium, eat a variety of calcium-rich foods. Good sources of calcium include dark, leafy greens, like spinach, kale, and collards; dairy foods, such as yogurt, milk, and cheese; and canned fish with soft bones, including salmon and sardines. You can increase your intake of vitamin D by eating foods fortified with vitamin D (orange juice, cereal, and milk). You also can get vitamin D by being in the sun for 15 minutes a few days a week.

Calcium and vitamin D supplements also are available. However, taking these supplements comes with a small increased risk of kidney stones. If you do not have osteoporosis, are not vitamin D deficient, and have never had a fracture, dietary sources of calcium and vitamin D are best. If you have questions about your calcium and vitamin D intake and whether you need a supplement, talk with your health care professional.

Finally...

Keeping your bones healthy is essential throughout life. Exercise every day, even if you walk only a few blocks, and get enough calcium and vitamin D. Talk with your health care professional about ways to prevent, diagnose, and treat osteoporosis.

Glossary

Body Mass Index (BMI): A number calculated from height and weight. BMI is used to determine whether a person is underweight, normal weight, overweight, or obese.

Calcium: A mineral stored in bone that gives it hardness.

Collagen: Proteins in bone and cartilage that serve as connective tissue between cells.

Corticosteroids: Drugs given for arthritis or other medical conditions. These drugs also are given to help fetal lungs mature before birth.

Diabetes Mellitus: A condition in which the levels of sugar in the blood are too high.

Endometriosis: A condition in which tissue that lines the uterus is found outside of the uterus, usually on the ovaries, fallopian tubes, and other pelvic structures.

Estrogen: A female hormone produced in the ovaries.

Gonadotropin-releasing Hormone (GnRH) Agonists: Medical therapy used to block the effects of certain hormones.

Hormone: A substance made in the body that controls the function of cells or organs.

Hormone Therapy: Treatment in which estrogen and often progestin are taken to help relieve symptoms that may happen around the time of menopause.

Inflammatory Bowel Disease: The name for a group of diseases that cause inflammation of the intestines. Examples include Crohn's disease and ulcerative colitis.

Lupus: An autoimmune disorder that causes changes in the joints, skin, kidneys, lungs, heart, or brain.

Menopause: The time when a woman's menstrual periods stop permanently. Menopause is confirmed after 1 year of no periods.

Osteoporosis: A condition of thin bones that could allow them to break more easily.

Ovaries: Organs in women that contain the eggs necessary to get pregnant and make important hormones, such as estrogen, progesterone, and testosterone.

Rheumatoid Arthritis (RA): A chronic disease that causes pain, swelling, redness, and irritation of the joints and changes in the muscles and bones. The condition can become more severe with time.

Vertebrae: Bones of the spine.

This information was designed as an educational aid to patients and sets forth current information and opinions related to women's health. It is not intended as a statement of the standard of care, nor does it comprise all proper treatments or methods of care. It is not a substitute for a treating clinician's independent professional judgment. Please check for updates at www.acog.org to ensure accuracy.

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