



**National Institutes of Health  
Osteoporosis and Related  
Bone Diseases ~  
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# What People With Osteogenesis Imperfecta Need to Know About Osteoporosis

## What Is Osteogenesis Imperfecta?

Osteogenesis imperfecta (OI) is a genetic disorder characterized by bones that break easily, often from little or no apparent trauma. OI is highly variable, and signs and symptoms range from mild to severe. In addition to broken bones, people with OI sometimes have muscle weakness or joint laxity (loose joints), and they often have skeletal malformations including short stature, scoliosis (curvature of the spine), and bowing of long bones. A classification system featuring different types of OI is commonly used to help describe how severely a person with OI is affected. OI occurs with equal frequency in males and females and among all ethnic and racial groups.

OI is caused by genetic defects that affect the body's production of type I collagen. Collagen is the major protein of the body's connective tissue and can be likened to the framework around which a building is constructed. In dominant (classical) OI, a person has too little type I collagen or a poor quality of type I collagen due to a mutation in one of the type I collagen genes. In recessive OI, mutations in other genes interfere with collagen production. The result in all cases is weak bones that break easily.

## What Is Osteoporosis?

Osteoporosis is a condition in which the bones become less dense and more likely to break. Fractures (broken bones) from osteoporosis can result in significant pain and disability. It is a major health threat for an estimated 44 million Americans, 68 percent of whom are women.

Risk factors for developing osteoporosis include:

- having a family history of the disease
- for women, being postmenopausal, having an early menopause, or not having menstrual periods (amenorrhea)
- using certain medications, such as glucocorticoids
- not getting enough calcium
- not getting enough physical activity
- smoking
- drinking too much alcohol.

Osteoporosis is a silent disease until a fracture occurs. It can often be prevented. However, if undetected, it can worsen over many years without symptoms. It has been called “a pediatric disease with geriatric consequences,” because building healthy bones in one’s youth is important to help prevent osteoporosis and broken bones later in life.

### **The OI – Osteoporosis Link**

The term osteoporosis describes bone loss that is extensive enough to increase the risk of fracture. The term is a general one, not related to any specific cause for the bone loss. In fact, there are many causes of osteoporosis. Almost all people with OI have osteoporosis, because they do not develop appropriate bone mass at any age. Women and men with OI can experience additional bone loss, such as age-related bone loss, superimposed on a background of OI. Symptoms of additional bone loss may appear at a younger age than commonly seen in people who do not have OI. When women and men with osteogenesis imperfecta become middle-aged, their risk of breaking bones more easily increases even further. Factors such as a diet low in calcium and vitamin D, smoking, decreased activity, and decreased levels of protective sex hormones (testosterone, estrogen, etc.) can compromise bone density and lead to a return to the fracture cycles they experienced as children.

### **Osteoporosis Management Strategies**

Strategies for prevention and treatment of osteoporosis in people with osteogenesis imperfecta are generally the same as those for people who do not have OI.

**Nutrition:** For healthy bones, it is important to have a diet with levels of calcium and vitamin D that are appropriate for the person's size. Good sources of calcium include low-fat dairy products and calcium-fortified foods and beverages. When a person has a significant calcium deficiency, supplements can help ensure that the daily calcium requirement is met, assuming that urine calcium levels are not elevated.

Vitamin D plays an important role in calcium absorption and bone health. It is made in the skin through exposure to sunlight. Vitamin D supplements may be needed if vitamin D-fortified foods are not part of the diet.

**Exercise:** Like muscle, bone is living tissue that responds to exercise by becoming stronger. Weight-bearing exercises that work against gravity are best for preventing bone loss. Some examples include walking, standing, and lifting. Swimming can also be a beneficial form of exercise. Because water activities do little to increase or maintain bone density, however, people with OI should also try to add walking or other weight-bearing exercise to their physical activity program, if possible.

Exercise can be challenging for people with OI, who must cope with muscle weakness, bone fragility and malformations, joint instability, and pain. However, regular exercises in moderation, such as walking, can help prevent bone loss and provide other health benefits. All adults, including those who spend most of their time in wheelchairs, need to consult with their doctor and a physical therapist about developing an appropriate exercise program.

**Healthy lifestyle:** Smoking has a negative effect on all body systems, including bones. Excess alcohol consumption can also negatively affect bone health and predispose a person to falls and fractures.

**Bone density test:** Bone mineral density (BMD) tests measure bone density in various sites of the body. BMD measurements are often reported in terms of peak bone mass in young adults. However, people with OI, because of short stature, curvature of the spine, past vertebral fractures, or the presence of metal rodding, may not be able to get an accurate reading. Almost all adults who have OI have low BMD. However, a baseline measurement in early middle age can be an important part of health management for adults with OI. This gives them a personal standard to compare to and determine whether their bone density is changing over time or as the result of a treatment.

**Medication:** There is no cure for osteoporosis. However, there are medications available to prevent bone loss, increase bone mass, and treat the disease. Women and men who have OI seem to be using these medications successfully. Consult with your doctor to determine which medication is right for you. These medications usually require long-term use.

## **Resources**

For more information about osteogenesis imperfecta, contact:

National Institutes of Health

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### **For Your Information**

For updates and for any questions about any medications you are taking, please contact the U.S. Food and Drug Administration at 1-888-INFO-FDA (1-888-463-6332, a toll-free call) or visit their Web site at [www.fda.gov](http://www.fda.gov).

*Recognizing the National Bone and Joint Decade 2002-2011*