



**National Institutes of Health
Osteoporosis and Related
Bone Diseases ~
National Resource Center**

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What People With Diabetes Need to Know About Osteoporosis

What Is Diabetes?

Diabetes is a disorder of metabolism, a term that describes the way our bodies chemically change the foods we eat into growth and energy. After we digest food, glucose (sugar) enters the bloodstream, where it is used by the cells for energy. For glucose to get into the cells, insulin must be present.

Insulin is a hormone produced by the pancreas, an organ located behind the stomach. It is responsible for moving glucose from the bloodstream into the cells to provide energy needed for daily life. In people with diabetes, the body produces too little or no insulin or it does not respond properly to the insulin that is produced. As a result, glucose builds up in the blood and may overflow into the urine where it is excreted from the body. Therefore, the cells lose their main source of energy.

More than 20 million Americans have diabetes. Of these, approximately 5 to 10 percent have type 1 diabetes and 90 to 95 percent have type 2 diabetes.

- In **type 1 diabetes**, the body produces little or no insulin. This form of the disease typically appears in children and young adults, but it can develop at any age.
- In **type 2 diabetes**, the body produces insulin but not enough, and the body does not respond properly to the insulin that is produced. This form of the disease is more common in people who are older, overweight, and inactive.

What Is Osteoporosis?

Osteoporosis is a condition in which the bones become less dense and more likely to fracture. Fractures from osteoporosis can result in pain and disability.

Osteoporosis is a major health threat for an estimated 44 million Americans, 68 percent of whom are women.

Risk factors for developing osteoporosis include:

- being thin or having a small frame
- 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 disease that often can be prevented. If undetected, it can progress for many years without symptoms until a fracture occurs.

The Diabetes–Osteoporosis Link

Type 1 diabetes is linked to low bone density, although researchers don't know exactly why. Insulin, which is deficient in type 1 diabetes, may promote bone growth and strength. The onset of type 1 diabetes typically occurs at a young age when bone mass is still increasing. It is possible that people with type 1 diabetes achieve lower peak bone mass, the maximum strength and density that bones reach. People usually reach their peak bone mass by age 30. Low peak bone mass increases one's risk of developing osteoporosis later in life. Some people with type 1 diabetes also have celiac disease, which is associated with reduced bone mass. It is also possible that cytokines, substances produced by various cells in the body, play a role in the development of both type 1 diabetes and osteoporosis.

Recent research also suggests that women with type 1 diabetes may have an increased fracture risk, since vision problems and nerve damage associated with the disease have been linked to an increased risk of falls and related fractures. Hypoglycemia, or low blood sugar reactions, may also contribute to falls.

Increased body weight can reduce one's risk of developing osteoporosis. Since excessive weight is common in people with type 2 diabetes, affected people were long believed to be protected against osteoporosis. However, although bone density is increased in people with type 2 diabetes, fractures are increased. As with

type 1 diabetes, this may be due to increased falls because of vision problems and nerve damage. Moreover, the sedentary lifestyle common in many people with type 2 diabetes also interferes with bone health.

Managing Osteoporosis

Strategies to prevent and treat osteoporosis in people with diabetes are the same as for those without diabetes.

Nutrition: A diet rich in calcium and vitamin D is important for healthy bones. Good sources of calcium include low-fat dairy products; dark green, leafy vegetables; and calcium-fortified foods and beverages. Many low-fat and low-sugar sources of calcium are available. Also, supplements can help you meet the daily requirements of calcium and other important nutrients.

Vitamin D plays an important role in calcium absorption and bone health. It is synthesized in the skin through exposure to sunlight. Although many people are able to obtain enough vitamin D naturally, older individuals are often deficient in this vitamin due, in part, to limited time spent outdoors. They may require vitamin D supplements to ensure an adequate daily intake.

Exercise: Like muscle, bone is living tissue that responds to exercise by becoming stronger. The best exercise for your bones is weight-bearing exercise that forces you to work against gravity. Some examples include walking, stair climbing, and dancing. Regular exercise can help prevent bone loss and, by enhancing balance and flexibility, reduce the likelihood of falling and breaking a bone. Exercise is especially important for people with diabetes since exercise helps insulin lower blood glucose levels.

Healthy lifestyle: Smoking is bad for bones as well as for the heart and lungs. Women who smoke tend to go through menopause earlier, triggering earlier bone loss. In addition, smokers may absorb less calcium from their diets. Alcohol can also negatively affect bone health. Heavy drinkers are more prone to bone loss and fracture because of poor nutrition as well as an increased risk of falling. Avoiding smoking and alcohol can also help with managing diabetes.

Bone density test: Specialized tests known as bone mineral density (BMD) tests measure bone density in various parts of the body. These tests can detect osteoporosis before a bone fracture occurs and predict one's chances of fracturing in the future. The most widely recognized bone mineral density test is called a dual-energy x-ray absorptiometry or DXA test. It is painless: a bit like having an x ray, but with much less exposure to radiation. It can measure bone density at your hip and spine. People with diabetes should talk to their doctors about whether they might be candidates for a bone density test.

Medication: Like diabetes, there is no cure for osteoporosis. However, several medications are approved by the Food and Drug Administration for the prevention and treatment of osteoporosis in postmenopausal women and in men. Medications are also approved for use in both women and men with glucocorticoid-induced osteoporosis.

Resources

For additional information on osteoporosis, visit the NIH Resource Center's Web site at www.niams.nih.gov/bone or call 800-624-2663.

For additional information on diabetes, visit the National Institute of Diabetes and Digestive and Kidney Diseases Web site at <http://diabetes.niddk.nih.gov/> or call 800-860-8747.

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For Your Information

This publication contains information about medications used to treat the health condition discussed here. When this fact sheet was printed, we included the most up-to-date (accurate) information available. Occasionally, new information on medication is released.

For updates and for any questions about any medications you are taking, please contact the Food and Drug Administration at 888-INFO-FDA (888-463-6332, a toll-free call) or visit its Web site at www.fda.gov.

For updates and questions about statistics, please contact the Centers for Disease Control and Prevention's National Center for Health Statistics toll free at 800-232-4636 or visit its Web site at www.cdc.gov/nchs.

Recognizing the National Bone and Joint Decade: 2002-2011