



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

2 AMS Circle  
Bethesda, MD  
20892-3676

**Tel:** (800) 624-BONE or  
(202) 223-0344  
**Fax:** (202) 293-2356  
**TTY:** (202) 466-4315

**Internet:** [www.niams.nih.gov/bone](http://www.niams.nih.gov/bone)  
**E-mail:** [NIAMSBONEINFO@  
mail.nih.gov](mailto:NIAMSBONEINFO@mail.nih.gov)

The NIH Osteoporosis and Related Bone Diseases ~ National Resource Center is supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases with contributions from the National Institute of Child Health and Human Development, National Institute of Dental and Craniofacial Research, National Institute of Diabetes and Digestive and Kidney Diseases, NIH Office of Research on Women's Health, DHHS Office on Women's Health, and the National Institute on Aging.

*The National Institutes of Health (NIH) is a component of the U.S. Department of Health and Human Services.*



# Osteoporosis: The Diagnosis

Osteoporosis is a condition of low bone density that can progress silently over a long period of time. If diagnosed early, the fractures associated with the disease can often be prevented. Unfortunately, osteoporosis frequently remains undiagnosed until a fracture occurs.

An examination to diagnose osteoporosis can involve several steps that predict your chances of future fracture, diagnose osteoporosis, or both. It might include:

- an initial physical exam
- various x rays that detect skeletal problems
- laboratory tests that reveal important information about the metabolic process of bone breakdown and formation
- a bone density test to detect low bone density.

Before performing any tests, your doctor will record information about your medical history and lifestyle and will ask questions related to:

- risk factors, including information about any fractures you have had
- your family history of disease, including osteoporosis
- medication history
- general intake of calcium and vitamin D
- exercise pattern
- for women, menstrual history.

In addition, the doctor will note medical problems and medications you may be taking that can contribute to bone loss (including glucocorticoids, such as cortisone). He or she will also check your height for changes and your posture to note any curvature of the spine from vertebral fractures, which is known as kyphosis.

## **Risk Factors for Osteoporotic Fracture Include:**

- personal history of fracture as an adult
- history of fracture in a first-degree relative
- Caucasian or Asian race, although African Americans and Hispanic Americans are at significant risk as well
- advanced age
- being female
- dementia
- poor health, frailty, or both
- current cigarette smoking
- low body weight
- anorexia nervosa
- estrogen deficiency (past menopause, menopause before age 45, having both ovaries removed, or the absence of menstrual periods for a year or more prior to menopause)\*
- low testosterone levels in men
- use of certain medications such as corticosteroids and anticonvulsants
- lifelong low calcium intake
- excessive alcohol intake
- impaired eyesight despite adequate correction
- recurrent falls
- inadequate physical activity.

\*Women lose bone rapidly in the first 4-8 years following menopause, making them more susceptible to osteoporosis.

## **X Ray Tests**

If you have back pain, your doctor may order an x ray of your spine to determine whether you have had a fracture. An x ray also may be appropriate if you have experienced a loss of height or a change in posture. However, since an x ray can detect bone loss only after 30 percent of the skeleton has been depleted, the presence of osteoporosis may be missed.

## **Bone Mineral Density Tests**

A bone mineral density (BMD) test is the best way to determine your bone health. BMD tests can identify osteoporosis, determine your risk for fractures (broken bones), and measure your response to osteoporosis treatment. 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.

During a BMD test, an extremely low energy source is passed over part or all of the body. The information is evaluated by a computer program that allows the doctor to see how much bone mass you have. Since bone mass serves as an approximate measure of bone strength, this information also helps the doctor accurately detect low bone mass, make a definitive diagnosis of osteoporosis, and determine your risk of future fractures.

BMD tests provide doctors with a measurement called a T-score, a number value that results from comparing your bone density to optimal bone density. When a T-score appears as a negative number such as -1, -2 or -2.5, it indicates low bone mass. The more negative the number, the greater the risk of fracture.

Although no bone density test is 100 percent accurate, this type of test is the single most important predictor of whether a person will fracture in the future.

## **Bone Scans**

For some people, a bone scan may be ordered. A bone scan is different from the BMD test just described, although the term “bone scan” often is used incorrectly to describe a bone density test. A bone scan can tell the doctor whether there are changes that may indicate cancer, bone lesions, inflammation, or new fractures. In a bone scan, the person being tested is injected with a dye that allows a scanner to identify differences in the conditions of various areas of bone tissue.

## **Laboratory Tests**

A number of laboratory tests may be performed on blood and urine samples. The results of these tests can help your doctor identify conditions that may be contributing to your bone loss.

The most common blood tests evaluate:

- blood calcium levels
- blood vitamin D levels
- thyroid function
- parathyroid hormone levels
- estradiol levels to measure estrogen (in women)
- follicle stimulating hormone (FSH) test to establish menopause status
- testosterone levels (in men)
- osteocalcin levels to measure bone formation.

The most common urine tests are:

- 24-hour urine collection to measure calcium metabolism
- tests to measure the rate at which a person is breaking down or resorbing bone.

## **Treatment**

In addition to diagnosing osteoporosis, results from BMD tests assist the doctor in deciding whether to begin a prevention or treatment program. Once you and your doctor have definitive information based on your history, physical examination, and diagnostic tests, a specific treatment program can be developed for you.

Recommendations for optimizing bone health include a comprehensive program that consists of a well-balanced diet rich in calcium and vitamin D, physical activity, and a healthy lifestyle (including not smoking, avoiding excessive alcohol use, and recognizing that some prescription medications and chronic diseases can cause bone loss). If you already have experienced a fracture, your doctor may refer you to a specialist in physical therapy or rehabilitation medicine to help you with daily activities, safe movement, and exercises to improve your strength and balance.

*The National Resource Center acknowledges the assistance of the National Osteoporosis Foundation in the preparation of this publication.*

Revised November 2005

---

### **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).