



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

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Osteoporosis in Men

Osteoporosis is a disease that causes the skeleton to weaken and the bones to break. It poses a significant threat to more than 2 million men in the United States. After age 50, 6 percent of all men will experience a hip fracture and 5 percent will have a vertebral fracture as a result of osteoporosis.

Despite these compelling figures, a majority of American men view osteoporosis solely as a “woman’s disease,” according to a 1996 Gallup Poll. Moreover, among men whose lifestyle habits put them at increased risk, few recognize the disease as a significant threat to their mobility and independence.

Osteoporosis is called a “silent disease” because it progresses without symptoms until a fracture occurs. It develops less often in men than in women because men have larger skeletons, their bone loss starts later and progresses more slowly, and they have no period of rapid hormonal change and bone loss. However, in the last few years the problem of osteoporosis in men has been recognized as an important public health issue, particularly in light of estimates that the number of men above the age of 70 will continue to increase as life expectancy continues to rise.

Clearly, more information is needed about the causes and treatment of osteoporosis in men, and researchers are beginning to turn their attention to this long-neglected group.

For example, in 1999, the National Institutes of Health launched a major research effort that will attempt to answer some of the many remaining questions. The 7-year, multisite study will follow more than 5,000 men ages 65

and older to determine how much the risk of fracture in men is related to bone mass and structure, biochemistry, lifestyle, tendency to fall, and other factors.

The results of such studies will help doctors to better understand how to prevent, manage, and treat osteoporosis in men. This fact sheet describes the highlights of what is already known.

What Causes Osteoporosis?

Bone is constantly changing – that is, old bone is removed and replaced by new bone. During childhood, more bone is produced than removed, so the skeleton grows in both size and strength. For most people, bone mass peaks during the third decade of life. By this age, men typically have accumulated more bone mass than women. After this point, the amount of bone in the skeleton typically begins to decline slowly as removal of old bone exceeds formation of new bone.

Men in their 50s do not experience the rapid loss of bone mass that women do in the years following menopause. By age 65 or 70, however, men and women are losing bone mass at the same rate, and the absorption of calcium, an essential nutrient for bone health throughout life, decreases in both sexes. Excessive bone loss causes bone to become fragile and more likely to fracture.

Fractures resulting from osteoporosis most commonly occur in the hip, spine, and wrist, and can be permanently disabling. Hip fractures are especially dangerous. Perhaps because such fractures tend to occur at older ages in men than in women, men who sustain hip fractures are more likely than women to die from complications.

Primary and Secondary Osteoporosis

There are 2 main types of osteoporosis: primary and secondary. In cases of primary osteoporosis, either the condition is caused by age-related bone loss (sometimes called *senile osteoporosis*) or the cause is unknown (*idiopathic osteoporosis*). The term idiopathic osteoporosis is used only for men less than 70 years old; in older men, age-related bone loss is assumed to be the cause.

The majority of men with osteoporosis have at least one (sometimes more than one) secondary cause. In cases of secondary osteoporosis, the loss of bone mass is caused by certain lifestyle behaviors, diseases, or medications. The most common causes of secondary osteoporosis in men include exposure to glucocorticoid medications, hypogonadism (low levels of testosterone), alcohol abuse, smoking, gastrointestinal disease, hypercalciuria, and immobilization.

Causes of Secondary Osteoporosis in Men

- glucocorticoid medications
- other immunosuppressive drugs
- hypogonadism (low testosterone levels)
- excessive alcohol consumption
- smoking
- chronic obstructive pulmonary disease and asthma
- cystic fibrosis
- gastrointestinal disease
- hypercalciuria
- anticonvulsant medications
- thyrotoxicosis
- hyperparathyroidism
- immobilization
- osteogenesis imperfecta
- homocystinuria
- neoplastic disease
- ankylosing spondylitis and rheumatoid arthritis
- systemic mastocytosis

Glucocorticoid medications: Glucocorticoids are steroid medications used to treat diseases such as asthma and rheumatoid arthritis. Bone loss is a very common side effect of these medications. The bone loss these medications cause may be due to their direct effect on bone, muscle weakness or immobility, reduced intestinal absorption of calcium, a decrease in testosterone levels, or, most likely, a combination of these factors.

When glucocorticoid medications are used on an ongoing basis, bone mass often decreases quickly and continuously, with most of the bone loss in the ribs and vertebrae. Therefore, people taking these medications should talk to their doctor about having a bone mineral density (BMD) test. Men should also be tested to monitor testosterone levels, as glucocorticoids often reduce testosterone in the blood.

A treatment plan to minimize loss of bone during long-term glucocorticoid therapy may include using the minimal effective dose, and discontinuing the drug or administering it through the skin, if possible. Adequate calcium and vitamin D intake is important, as these nutrients help reduce the impact of glucocorticoids on the bones. Other possible treatments include testosterone replacement and osteoporosis medication. Alendronate and risedronate are two bisphosphonate medications approved by the U.S. Food and Drug Administration (FDA) for use by men and women with glucocorticoid-induced osteoporosis.

Hypogonadism: Hypogonadism refers to abnormally low levels of sex hormones. It is well known that loss of estrogen causes osteoporosis in women. In men, reduced levels of sex hormones may also cause osteoporosis.

While it is natural for testosterone levels to decrease with age, there should not be a sudden drop in this hormone that is comparable to the drop in estrogen

experienced by women at menopause. However, medications like glucocorticoids (discussed above), cancer treatments (especially for prostate cancer), and many other factors can affect testosterone levels. Testosterone replacement therapy may be helpful in preventing or slowing bone loss. Its success depends on factors such as age and how long testosterone levels have been reduced. Also, it is not yet clear how long any beneficial effect of testosterone replacement will last. Therefore, doctors usually treat the osteoporosis directly, using medications approved for this purpose.

Recent research suggests that estrogen deficiency may also be a cause of osteoporosis in men. For example, estrogen levels are low in men with hypogonadism and may play a part in bone loss. Osteoporosis has been found in some men who have rare disorders involving estrogen. Therefore, the role of estrogen in men is under active investigation.

Alcohol abuse: There is a wealth of evidence that alcohol abuse may decrease bone density and lead to an increase in fractures. Low bone mass is common in men who seek medical help for alcohol abuse.

In cases where bone loss is linked to alcohol abuse, the first goal of treatment is to help the patient stop – or at least reduce – his consumption of alcohol. More research is needed to determine whether bone lost to alcohol abuse will rebuild once drinking stops, or even whether further damage will be prevented. It is clear, though, that alcohol abuse causes many other health and social problems, so quitting is ideal. A treatment plan may also include a balanced diet with lots of calcium- and vitamin D-rich foods, a program of physical exercise, and smoking cessation.

Smoking: Bone loss is more rapid, and rates of hip and vertebral fracture are higher, among men who smoke, although more research is needed to determine exactly how smoking damages bone. Tobacco, nicotine, and other chemicals found in cigarettes may be directly toxic to bone, or they may inhibit absorption of calcium and other nutrients needed for bone health. Quitting is the ideal approach, as smoking is harmful in so many ways. As with alcohol, it is not known whether quitting smoking leads to reduced rates of bone loss or to a gain in bone mass.

Gastrointestinal disorders: Several nutrients – including amino acids, calcium, magnesium, phosphorous, and vitamins D and K – are important for bone health. Diseases of the stomach and intestines can lead to bone disease when they impair absorption of these nutrients. In such cases, treatment for bone loss may include taking supplements to replenish these nutrients.

Hypercalciuria: Hypercalciuria is a disorder that causes too much calcium to be lost through the urine, which makes the calcium unavailable for building bone.

Patients with hypercalciuria should talk to their doctor about having a BMD test and, if bone density is low, discuss treatment options.

Immobilization: Weight-bearing exercise is essential for maintaining healthy bones. Without it, bone density may decline rapidly. Prolonged bed rest (following fractures, surgery, spinal cord injuries, or illness) or immobilization of some part of the body often result in significant bone loss. It is crucial to resume weight-bearing exercise (such as walking, jogging, dancing, and lifting weights) as soon as possible after a period of prolonged bed rest. If this is not possible, you should work with your doctor to minimize other risk factors for osteoporosis.

How Is Osteoporosis Diagnosed in Men?

Osteoporosis can be effectively treated if it is detected before significant bone loss has occurred. A medical workup to diagnose osteoporosis will include a complete medical history, x rays, and urine and blood tests. The doctor may also order a BMD (bone mineral density) test. This test 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.

It is increasingly common for women to be diagnosed with osteoporosis or low bone mass using a BMD test, often at midlife when doctors begin to watch for signs of bone loss. In men, however, the diagnosis is often not made until a fracture occurs or a man complains of back pain and sees his doctor. This makes it especially important for men to inform their doctors about risk factors for developing osteoporosis, loss of height or change in posture, a fracture, or sudden back pain.

What Are the Risk Factors for Men?

Several risk factors have been linked to osteoporosis in men:

- chronic diseases that affect the kidneys, lungs, stomach, and intestines or alter hormone levels
- regular use of certain medications, such as glucocorticoids
- undiagnosed low levels of the sex hormone testosterone
- unhealthy lifestyle habits: smoking, excessive alcohol use, low calcium intake, and inadequate physical exercise
- age. The older you are, the greater your risk.
- race. Caucasian men appear to be at particularly high risk, but all men can develop this disease.

Some doctors may be unsure how to interpret the results of a BMD test in men, because it is not known whether the World Health Organization guidelines used to diagnose osteoporosis or low bone mass in women are also appropriate for men. Although controversial, the International Society for Clinical Densitometry recommends using separate guidelines when interpreting BMD test results in men.

What Treatments Are Available?

Once a man has been diagnosed with osteoporosis, his doctor may prescribe one of the medications approved by the FDA for this disease. Alendronate has been approved to treat the disease in men and postmenopausal women. Alendronate and risedronate are approved for glucocorticoid-induced osteoporosis in both men and women. Teriparatide is approved to treat osteoporosis in men and women who are at increased risk of fracture.

The treatment plan will also likely include the nutrition, exercise, and lifestyle guidelines for preventing bone loss listed at the end of this fact sheet.

If bone loss is due to glucocorticoid use, the doctor may prescribe a bisphosphonate (e.g., alendronate or risedronate), monitor bone density and testosterone levels, and suggest using the minimum effective dose of glucocorticoid. The doctor may also suggest discontinuing the drug when practical, and/or administering it topically (through the skin).

Other possible prevention or treatment approaches include calcium and/or vitamin D supplements and regular physical activity.

If osteoporosis is the result of another condition (such as testosterone deficiency) or exposure to certain other medications, the doctor may design a treatment plan to address the underlying cause.

How Can Osteoporosis Be Prevented?

There have been fewer research studies on osteoporosis in men than in women. However, experts agree that all people should take the following steps to preserve their bone health:

- Avoid smoking, reduce alcohol intake, and increase your level of physical activity.
- Ensure a daily calcium intake that is adequate for your age.
- Ensure an adequate intake of vitamin D. Normally, the body makes enough vitamin D from exposure to as little as 10 minutes of sunlight a day. If exposure to sunlight is inadequate, dietary vitamin D intake should be

- between 200 and 600 IU (International Units) per day (See Table). 400 IU is the amount found in one quart of fortified milk and most multivitamins.
- Engage in a regular regimen of weight-bearing exercises in which bones and muscles work against gravity. This might include walking, jogging, racquet sports, stair climbing, team sports, lifting weights, and using resistance machines. A doctor should evaluate the exercise program of anyone already diagnosed with osteoporosis to determine if twisting motions and impact activities, such as those used in golf, tennis, or basketball, need to be curtailed.
 - Discuss with your doctor the use of medications that are known to cause bone loss, such as glucocorticoids.
 - Recognize and seek treatment for any underlying medical conditions that affect bone health.

Recommendations for Calcium and Vitamin D Intake		
Age	Calcium (mg)	Vitamin D (IU)
19-30	1,000	200
31-50	1,000	200
51-70	1,200	400
70+	1,200	600
Upper limit	2,500	2,000

Source: *National Academy of Sciences, 1997*

Resource

For additional information on osteoporosis, visit the National Institutes of Health Osteoporosis and Related Bone Diseases ~ National Resource Center Web site at www.niams.nih.gov/bone or call 1-800-624-2663.

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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 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.