THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
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Osteoporosis

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What is osteoporosis?

Osteoporosis means "porous bones." It is a condition where the skeleton becomes fragile and results in broken bones under normal use. Osteoporosis is a "silent" condition that happens slowly over years. The rate of bone loss ("resorption") exceeds the rate of new bone formation ("acretion"). Many times neither a person nor a doctor is aware of weakened bones until one breaks unexpectedly.

What are the symptoms of osteoporosis?

Because of mineral loss, osteoporosis can cause progressive breaks in a person's back. This causes a person to lose height and get shorter and shorter. This spinal compression causes a gradual decrease in height due to forward bending of the upper spine. This eventually results in a painful, stooped back, commonly referred to as a "dowager's hump." Loss of height can also result in a "pot belly" or a prominent abdomen even with no increase in weight **(Figure 1)**.

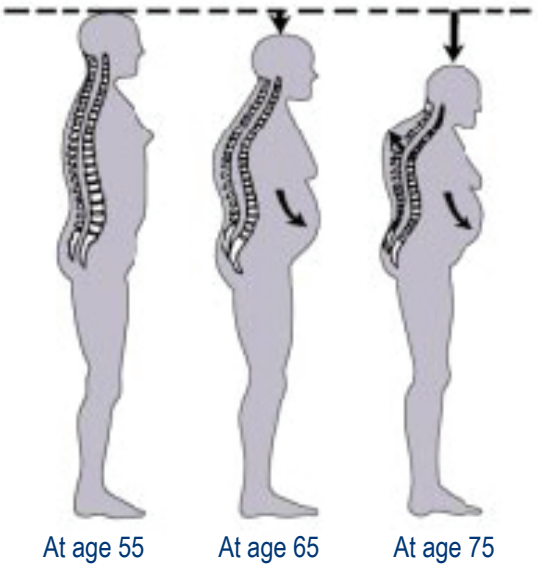

Figure 1. Progressive Vertebral Compression Fractures

What are the risk factors for osteoporosis you CAN NOT control?

Unchangeable risk factors are:

- **gender** i.e. being female. Women are five times more likely to develop osteoporosis than men.
- lack of exercise. Bedridden people lose bone faster than people who exercise regularly.
- having a thin, small-boned frame.
- a family history of older family members with broken bones or stooped posture, especially women, which suggests osteoporosis.
- a history of disordered eating that may have contributed to a loss of regular menstrual cycles.
- an early menopause in women before age 45 due to estrogen deficiency, either naturally or resulting from surgical removal of the ovaries and not treated with hormone replacement therapy.
- **race.** Caucasian and Asian women are at highest risk while African and Hispanic women are at lower risk.
- **prolonged use of some medications** such as glucocorticoids (prednisone) used as an anti- inflammatory to treat asthma or arthritis, excessive thyroid hormone, and some anti-seizure medications; and antacids that contain aluminum.
- **age.** The risk of osteoporosis increases with age, a low testosterone level in men, and a low estrogen level in women not treated with hormone therapy.

Those listed above are risk factors you can not control. Are there other risk factors that you CAN control?

Yes, you can control some risk factors with lifestyle changes. Some suggestions are listed below.

- Get foods that are rich in calcium and vitamin D.
- Don't smoke or quit smoking.

- If you drink alcohol, do so in moderation.
- Get regular weight bearing and resistance exercise.
- Avoid excess protein intake.
- Avoid extreme dieting that can lead to loss of regular menstrual cycles.
- Avoid excessive caffeine.

What's so bad about having osteoporosis?

Having osteoporosis can steal the "good life." The simplest things can cause broken bones: sneezing, bending to pick up something, getting into the car or stepping off the curb. Hip fractures, which are one of the most common bones broken, can lead to permanent disability, loss of independence, or even death. Death rates from a broken hip range from 20 to 50 percent during the first year—so treatment is aggressive with increased physical rehabilitation and calcium and vitamin D are heavily promoted. Having a frail body can result in chronic pain and constant anxiety.

How is osteoporosis diagnosed?

Routine x-rays can't detect osteoporosis until it's quite advanced. However, noninvasive, painless bone density tests are useful for confirming a diagnosis of osteoporosis. Different parts of the skeleton may be measured: most commonly the wrist, hip and spinal vertebrae since these are the sites for the majority of fractures due to osteoporosis.

The FDA has approved several devices that use various methods to estimate bone density. Doctors consider a patient's medical history and risk factors in deciding who should have a bone density test. A simple, biochemical test performed on a urine sample can detect a specific component of bone breakdown called NTx. The NTx test, marketed as Osteomark® NTx, can help doctors monitor treatment and identify fast losers of bone for more aggressive treatment. But, this test may not be used to diagnose osteoporosis.

What can you do to prevent osteoporosis?

Osteoporosis can't be prevented outright. However, the onset of this condition can be delayed and the severity reduced. Calcium intake is critical in childhood and throughout life. Calcium can't build bone by itself; vitamin D is also required. A lifelong habit of weight bearing exercise such as hiking, stair climbing, jogging, and weight lifting helps build and maintain strong bones.

Is there a cure for osteoporosis?

There is no cure for osteoporosis. However, the onset of this condition can be delayed. Early intervention can prevent bone fractures.

What if I have trouble digesting milk?

People who have trouble digesting milk products can look for products treated to reduce lactose such as "sweet acidophilus" milk or take an over-the-counter aid to reduce dietary lactose such as Lactaid®. Some people with lactose intolerance can eat a small amount of dairy products with no digestive problems.

What kind of treatments are available for a person with osteoporosis?

Drug treatments ***(Table 1.):***

Table 1. Osteoporosis Drug Treatments

Medication	Common Brands	Type of FDA approval in post-menopausal women	Action
Bisphosphonates	Fosamax® Actonel® Boniva® Reclast®	Prevention and treatment	Makes bone stronger and less likely to break.
Hormone Replacement Therapy* (HRT)	Prempro®	Prevention	Makes bone stronger and less likely to break.
Recombinant Human Parathyroid Hormone (PTH)	Forteo™	Treatment	Builds new bone, which is less likely to break.
Selective Estrogen Receptor Modulators (SERMS)	Evista®	Prevention and treatment	Makes bone stronger and less likely to break.
Denosaumab First "biologic therapy".	Prolia® Xgeva®	Treatment	Slows the entire bone remodeling process, including the bone breakdown

* Estrogen replacement therapy and HRT are approved only for the prevention of osteo- porosis and not recommended for long-term treatment of osteoporosis because of the risk of adverse events. The Women's Health Initiative study showed an increase in coronary events and breast cancer and a decrease in fractures in women on HRT. When used for prevention of postmenopausal osteoporosis, alternative treatments should be carefully considered.

Non-drug treatments or supplements?

Calcium and vitamin D supplements are an integral part of all treatments for osteoporosis. Calcium carbonate supplements (e.g., Os-cal®, Caltrate®, Tums®) should be taken with meals. Calcium citrate (e.g., Citrical®) may be taken between meals. No more than 500 milligrams of a calcium supplement should be taken at one time **(Table 2)**. In addition, diet and weight-bearing exercise are important for treatment and for prevention of osteoporosis.

What foods can I eat to prevent osteoporosis?

Bone health requires a lot of nutrients and you're likely to get most of them from dairy products. For those concerned with lowering the fat in their diet, low fat and nonfat dairy products are still excellent sources of calcium and vitamin D. The best recommendation for overall good health includes a balanced and varied diet with foods adequate in calcium, protein, vitamins and minerals, and eating in moderation.

Table 2. Dietary Reference Intakes of Calcium

Age	Milligrams (mg)/day	Number of 8 ounce cups of milk to get recommended mg of calcium	*Tolerable Upper Intake Level (UL) mg/day
0-6 months	200	-	1,000
6-12 months	260	-	1,500
1-3 years	700	2 1/3	2,500
4-8 years	1,000	3 1/3	2,500
9-18 years	1,300	4 1/3	3,000
Males and Females 19 - 50 years	1,000	3 1/3	2,500
Males 51- 70 years	1,000	3 1/3	2,000
Females 51 -70 years	1,200	4	2,000
Adults > 70 years	1,200	4	2,000
Pregnancy and Lactation			
14 - 18 years	1,300	4	3,000
19 - 50 years	1,000	3 1/3	2,500

Source: Institute of Medicine, National Academy of Science, 2011.
*Taking more than the UL a day is not recommended.

Other ways to get CALCIUM into your diet— especially if you don't consume dairy products—is to eat foods fortified with calcium, such as orange juice, or to take calcium supplements.

Other good sources of calcium are:

- broccoli
- dark-green leafy vegetables like kale
- tofu, calcium fortified
- canned fish with bones
- fortified bread and cereal products

How much vitamin D do I need each day?

The current recommendation of the amount of vitamin D an individual should not consume more than is 4000 IU a day **(Table 3)**. It is difficult to get too much vitamin D unless a person is taking a prescription dose of the vitamin.

Table 3. Dietary Reference Intakes of Vitamin D

1 - 70 years of age	600
> 70 years of age	800
Pregnancy and Lactation 14 - 50 years of age	600

Source: Institute of Medicine, National Academy of Science, 2011.

What is the outlook for people with osteoporosis?

After talking to their doctor about possible medical treatments, persons diagnosed with osteoporosis should modify their risk factors that they can control such as not smoking or consuming excessive levels of alcohol. They'll need to get adequate nutrient intake especially calcium and vitamin D. Also, consulting with their doctor for a safe, individualized exercise program is recommended. High impact activities may be too risky. A good physical fitness program will reduce the risk of fractures by improving balance, muscle strength, and agility making falls less likely.

Where can I get more information on osteoporosis?

For more information, contact:

- National Osteoporosis Foundation
  http://www.nof.org
- National Institutes of Health Osteoporosis and Related Bone Diseases National Resource Center
  http://www.niams.nih.gov/Health_Info/Bone/

Where can I get more information on osteoporosis?

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