

# **Volunteer Leader Training Guide**

## **Osteoporosis: The Bone Thief**

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### **Introduction**

Osteoporosis is a very common bone disease that causes bone to become weak. Bone weakness can lead to fractures of the spine, hip and wrist from simple falls to even a sneeze or a cough.

About 10 million Americans have osteoporosis, 80 percent of them are women. One in two women has a fracture related to osteoporosis in her lifetime. The good news is that osteoporosis can be treated and prevented.

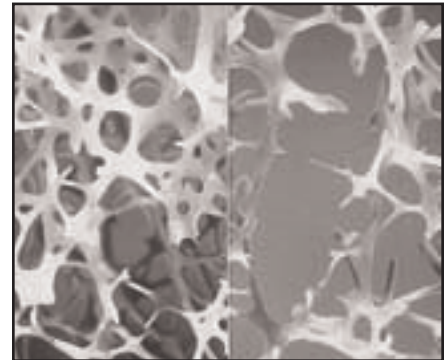
This reference summary will help you understand what osteoporosis is, as well as its symptoms, causes, diagnosis and treatment options. Also included are tips for prevention.

### **Osteoporosis**

Bone is a living tissue. It is mostly made of collagen, a protein that provides a soft framework, and calcium phosphate, a mineral that hardens the framework. Our bones are continually replenished throughout life. The body deposits new bone and removes old bone.

During childhood, more new bone is formed than old bone removed. The body's bone is the most dense and strong around age 30. After age 30, the body starts removing more old bone than forming new bone. There are two main reasons why osteoporosis may occur:

- If a person does not have enough strong bone mass by age 30 before bone loss begins.
- If bone loss after 30 happens fast.



### **What Is Bone?**

In order to understand osteoporosis, it is important to learn about bone. Made mostly of collagen, bone is living, growing tissue. Collagen is a protein that provides a soft framework, and calcium phosphate is a mineral that adds strength and hardens the framework. This combination of collagen and calcium makes bone strong and flexible enough to withstand stress. More than 99 percent of the body's calcium is contained in the bones and teeth. The remaining 1 percent is found in the blood.

There are two types of bone found in the body – *cortical* and *trabecular*. *Cortical* bone is dense and compact. It forms the outer layer of the bone. *Trabecular* bone makes up the inner layer of the bone and has a spongy, honeycomb-like structure.

## **Bone Remodeling**

Throughout life, bone is constantly renewed through a two-part process called *remodeling*. This process consists of resorption and formation. During resorption, old bone tissue is broken down and removed by special cells called osteoclasts. During bone formation, new bone tissue is laid down to replace the old. This task is performed by special cells called osteoblasts. Osteoclast and osteoblast function is regulated by several hormones including calcitonin, parathyroid hormone, vitamin D, estrogen (in women) and testosterone (in men), among others.

## **The Bone Bank Account**

Think of bone as a bank account where you “deposit” and “withdraw” bone tissue. During childhood and the teenage years, new bone is added to the skeleton faster than old bone is removed. As a result, bones become larger, heavier and denser. For most people, bone formation continues at a faster pace than removal until bone mass peaks during the third decade of life.

Remember, in order to be able to make “deposits” of bone tissue and reach the greatest possible peak bone mass, you need to get enough calcium, vitamin D and exercise – important factors in building bone.

After age 20, bone “withdrawals” can begin to exceed “deposits.” For many people, this bone loss can be prevented by continuing to get calcium, vitamin D and exercise and by avoiding tobacco and excessive alcohol use. Osteoporosis develops when bone removal occurs too quickly, replacement occurs too slowly or both. You are more likely to develop osteoporosis if you did not reach your maximum peak bone mass during your bone building years.

## **Women, Men and Osteoporosis**

Women are more likely than men to develop osteoporosis. This is because women generally have smaller, thinner bones, and because they can lose bone tissue rapidly in the first 4 to 8 years after menopause due to the sharp decline in production of the hormone estrogen. Produced by the ovaries, estrogen has been shown to have a protective effect on bone. Women usually go through menopause between ages 45 and 55. After menopause, bone loss in women greatly exceeds that in men. However, by age 65, women and men tend to lose bone tissue at the same rate. While men do not undergo the equivalent of menopause, production of the male hormone testosterone may decrease, and this can lead to increased bone loss and a greater risk of developing osteoporosis.

## **Osteoporosis Prevention**

Osteoporosis is preventable for many people. Prevention is important because while there are treatments for osteoporosis, a cure has not yet been found. A comprehensive program that can help prevent osteoporosis includes:

- a balanced diet rich in calcium and vitamin D.
- weight-bearing exercise.

- a healthy lifestyle with no smoking or excessive alcohol intake.
- bone density testing and, when appropriate, medication.

### Symptoms

People may not know they have osteoporosis until their bones become so weak that a sudden strain, bump or fall causes a hip fracture or a collapsed vertebra. A collapsed vertebra may cause severe back pain, spinal deformities or severely stooped posture.

Fractures can affect most bones of the body, but they mostly involve the hips, vertebrae, wrist and arms. Fractures can be very painful and very debilitating. The bones can become so weak that a sneeze or a cough could result in a vertebral fracture.

### Causes

Osteoporosis can begin at a young age if a person does not get enough calcium and vitamin D. After reaching maximum bone density and strength between the ages of 25 and 30, a person loses about 0.4 percent of bone strength each year. At this rate and with good nutrition, people should experience bone loss without developing osteoporosis.

After menopause, women lose bone mass at a higher rate, as high as 3 percent per year. A woman reaches menopause when she has the last period of her lifetime. After menopause, a woman's body makes much less estrogen. Estrogen is a hormone, a substance that flows in the blood to control bodily functions. It helps prevent osteoporosis.

Fortunately, there are medications that women can take after menopause to replace lost estrogen. This can help women prevent osteoporosis.

### Risk Factors

A person's gender is a risk factor; being a woman gives you a higher risk of having osteoporosis. A risk factor is something that increases the chances that a person will have a disease. Other main risk factors for osteoporosis are:

- **Age:** The older you are, the more likely are your chances of developing osteoporosis.
- **Body size:** The thinner your bone is, the more likely are your chances of developing osteoporosis.

Two risk factors of osteoporosis that you cannot control are:

- **Race:** White and Asian women are more likely to have osteoporosis than African-American or Latino women.
- **Family:** If your parents have osteoporosis, you are more likely to have it:

Fortunately, there are risk factors that you CAN control.

- **Calcium and vitamin D intake:** If you do not get enough calcium (Ca) and vitamin D from your diet, you are more likely to have osteoporosis.
- **Smoking:** If you smoke, you are more likely to develop osteoporosis.

- **Excess alcohol:** If you drink excessively, you are more likely to develop osteoporosis.
- **Inactivity:** If you have an inactive lifestyle, you are more likely to have osteoporosis.
- **Medicine:** Some medications increase the risk of osteoporosis, such as taking steroids or antacids for a long time.

### Diagnosis

Medications are available to help people with osteoporosis. To diagnose osteoporosis, doctors use special tests to measure bone density. Two common tests for bone density are the Dual Energy Absorptiometry and the Sahara Clinical Bone Sonometer. Regular x-rays show thinning of bone. However, by the time x-rays can reveal osteoporosis, the bones are already too weak and osteoporosis is in an advanced stage.

### Treatment

To treat osteoporosis, doctors may recommend:

- A healthy diet including calcium, vitamin D and calcium supplements
- Medication

Foods that includes calcium and vitamin D include dairy products, such as milk and cheese and oranges. Calcium supplements are as effective as calcium from food. They are inexpensive and well tolerated by the body.

Sometimes calcium supplements may cause constipation. Drinking more water and eating foods rich in fiber, such as vegetables and fruits, can help you avoid this.

Even though estrogen is very helpful in preventing osteoporosis, its use should be discussed with a gynecologist and should be monitored very closely. Hormone replacement therapy has several benefits but may also have several serious side effects. Some prescription medications help calcium get into new bone. Such medications include calcitonin, most commonly prescribed in the form of a nasal spray.

Other medications are available that help slow down bone loss. Some are the biphosphonate family. Alendronate (Fosamax®) and risedronate (Actonel®) are such medications. They have been shown to increase bone density and decrease the chances of future fractures.

They do have some side effects; the most bothersome is a severe heartburn because of inflammation in the feeding tube or esophagus.

Raloxifene (Evista®) is a medication that has estrogen-like effect on bone metabolism. Unfortunately, it may have some unwanted serious side effects such as blood clots in the legs.

Teriparatide (Forteo®) is an injectable medication that should be taken once a day for about 21 to 24 months. It is a normally occurring hormone that helps build more bone.

Your doctor will help you decide which medication or combination of medications may be best suited for you.

Repeated scans may be necessary to follow up on the efficacy of the treatment.

## **Prevention**

People of all ages can prevent osteoporosis through healthy life habits, including:

- a healthy, balanced diet rich in calcium and vitamin D.
- staying active.
- not smoking.
- not drinking excessively.

Exercise programs are encouraged but should be discussed with your doctor. Any sudden or excessive strain on your bones may lead to a fracture.

As people become older and their bones weaken, preventing falls is essential to avoid accidents that can be debilitating. People who develop osteoporosis should not lift, push or pull heavy objects. They must be careful not to trip on thick carpet or throw rugs or fall on slippery surfaces.

People with osteoporosis should keep their homes well lit and should take their time going from place to place, especially at night. Using a walker or a cane in unfamiliar surroundings can be helpful.

## **Summary**

Osteoporosis is a very common condition that can be prevented by good nutrition and a healthy lifestyle. Many medications are now available to help prevent or treat osteoporosis after a woman reaches menopause. Calcium and vitamin supplements are also available and inexpensive. For people with osteoporosis, fracturing a bone is a main concern. Avoiding falls, tripping and bumping into objects can prevent fractures and allow people with osteoporosis to live very healthy and productive lives.