



*Promoting Health and  
Preventing Complications  
Through Exercise*

*Rehabilitation Research and Training Center on Spinal Cord Injury*

# Osteoporosis and SCI

2005

## What is Osteoporosis?

**O**steoporosis is a condition in which bone mass (or bone mineral density) decreases. The term “osteo” means bone and “porosis” means spongy, which is just how osteoporotic bone looks on the inside. While normal bone has small holes in it, osteoporotic bone has much larger holes. These holes make it much easier for bones to break.



Osteoporosis occurs in almost everyone during the aging process. In people without disabilities it is much more common in women, especially in those who have already been through menopause.

You may be familiar with osteoporosis or have heard about friends or family who have had it. Have you ever known a woman who actually got shorter with age? This could be because of osteoporosis in her spine.

Osteoporosis occurs throughout the body and the result is that bones may break very easily or even for almost no reason at all – during range of motion (such as stretching), after a minor fall, or even after a bad spasm.

## Am I at risk for Osteoporosis?

**Y**es you are! Some factors that contribute to osteoporosis include:

- Sedentary lifestyle
- Being thin
- Poor nutrition
- Diabetes
- Smoking
- Low levels of vitamin D and calcium in your diet
- Being light skinned or fair haired
- Excessive alcohol or caffeine use

In addition to these, your SCI puts you at even greater risk of having osteoporosis.

Here are some key points about the osteoporosis that occurs after SCI:

- Men AND women are affected
- You get osteoporosis much younger
- The broken bones tend to occur in the legs, usually around the knee

The good news is...just because you have osteoporosis, it doesn't mean you'll have a broken bone. Only about 6% of people with SCI have brittle bone-related fractures. That may seem like a lot, but statistically the odds are still in your favor.

## What role does my SCI play?

Immediately after spinal cord injury, we know that bone resorption, or breakdown, begins to occur within days. Another unique finding after SCI is that within days of injury the body starts dumping minerals such as calcium into the urine. This calcium was originally in the bone and was resorbed, or lost into the blood and then leaves the body in the urine. Although we cannot see this bone loss on x-rays for months, we know it's occurring because we can measure calcium and other chemicals released during bone breakdown in your blood and urine shortly after injury. This bone loss is greatest in the first 3-12 months after injury, but still persists for several years after your injury.

We don't know exactly what causes your bones to break down so much after SCI, and probably there are several causes. One factor, though, is activity. We do know that when you exercise, muscle pulls on bone and this actually helps bone become stronger. After your spinal cord injury, some of your muscles are no longer able to function properly due to the paralysis, and therefore, are no longer able to pull on the bone to keep it strong. Because this bone loss occurs so rapidly after SCI there likely is something else about the SCI itself, such as a change in the autonomic nervous system and/or circulatory system, that makes osteoporosis worse.

When we look at the bone mass of people with spinal cord injury we actually see that bone loss is greatest in areas where you are paralyzed. For example, if you have paraplegia and use a wheelchair, you likely have had bone loss in your legs but not your arms. The muscles in your arms are still functioning and pull on the bones to keep them strong when you do many activities, such as pushing your wheelchair and transferring.

Even the bones in your spine are kept strong because to maintain your posture some or all of the muscles in your back are pulling on those bones keeping them strong even when you sit.

If you have tetraplegia (you may be more familiar with the term 'quadriplegia'), you have likely lost bone mass in your legs, and possibly in your arms and spine as well.

## How do I know I have Osteoporosis?

If you have a SCI, you have osteoporosis. In the time period shortly after your spinal cord has been injured, your body is rapidly dumping the calcium from your bones into your blood and urine. This is when osteoporosis can be diagnosed through blood work and urinalysis.

Later, and for the remainder of your life you will need higher tech x-rays such as DEXA or CAT scan to diagnose osteoporosis.

## How can I work with my doctor?

Review the risk factors above, think about where you are most likely to have osteoporosis based on your spinal cord injury, and then have a discussion with your doctor about preventing further bone loss. If you are considering starting some type of new therapy, physical activity or exercise program, especially one that involves standing or walking, discuss your risk of osteoporosis with your doctor first.

You can also talk to your doctor about research that is being done on some of the new drugs and therapies to prevent osteoporosis.

## How can I reduce my risk?

Just make sure to check with your doctor first before starting any of these therapies because you do not want to stand or exercise for the first time in years and then find yourself back in bed for weeks or even months with a broken bone.

Thus far, we haven't found good treatments to restore bone mass that has already been lost after spinal cord injury. Unfortunately, you probably can't cure osteoporosis. The general consensus is that you can't bring lost minerals back into bones. The best advice is to do everything you can in your power to prevent further bone loss. You can:

- Stop smoking
- Limit your alcohol and caffeine intake
- Get moving with physical activity and/or exercise
- Check with your doctor about the use of estrogen supplementation if you are a postmenopausal woman
- Eat a healthy and balanced diet, including getting the recommended amounts of calcium (in dairy products such as milk and cheese, and in shellfish and beans) and vitamin D (in eggs or through the use of vitamin supplements)
- Get out in the sun! Did you know that Vitamin D is made in the skin when you are in the sun? Other sources include vitamin D fortified milk, fatty fish and fish oils, and green leafy vegetables



Remember: Although osteoporosis and SCI is a fact of life, most people with SCI are not breaking bones. Thousands have made it to ripe old ages without breaking anything. The odds are in your favor and there are many ways to reduce your risk!!!

## Take Home Tips



1. If you have a SCI, you will experience bone loss (osteoporosis) more quickly than if you didn't have a SCI
2. With osteoporosis, your bones become more porous, or brittle. Brittle bones break more easily, but overall, your chances of breaking a bone are still very small
3. Bone mass that has been lost after your SCI cannot be replaced. But after your SCI, you can do many things to prevent further bone loss

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