Craig Hospital
Redefining Possible for People with Spinal Cord and Brain Injuries

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# Osteoporosis

*Rick was getting dressed one morning – just sliding on his pants and pulling up a sock. He heard a loud "**SNAP**." Broken hip, just like that. He was under 40, very active for his C6 injury, and hadn't had a lot of other injuries. So what went wrong? Read on...*

## What is Osteoporosis?

Throughout our lives our bones continually break themselves down and rebuild themselves. In the process, several vital minerals - especially calcium – are lost and then replaced. For Rick and others with osteoporosis, the breaking-down process happens faster than the rebuilding, and the net loss of minerals causes bones to become brittle. Fractures can happen for almost no reason – during range of motion, after a minor fall, even after a bad spasm. Hip bones (femurs) are often affected, but so are the back bones (vertebrae) and wrist bones. Osteoporosis can limit your function, and if your sitting posture is affected, it can increase your risk for skin and respiratory problems.

## The SCI Angle:

Osteoporosis occurs in almost everyone who ages. However, in the non-disabled population, older women who have gone through menopause have many more problems with osteoporosis than men. With spinal cord injury, it's a different story.

Soon after the injury – *regardless of your age or your sex* – bones begin to lose minerals and become less dense. Why? We don't know for sure, but we have some theories. First, all the things that are risks for osteoporosis in non-disabled people are risks for spinal cord injury survivors, too. These risks include:

- Diabetes
- Use of certain medicines (eg, antidepressants, warfarin (coumadin), long-term heparin, corticosteroids, thyroid medicine, anticonvulsants, antacids)
- Being thin or having a slender physique
- Light-skinned or fair-haired
- Calcium or Vitamin D deficiency
- Smoking


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- Having had scoliosis
- Excessive alcohol or caffeine use
- Following a diet extremely high in fiber or protein or low in calcium
- Certain medical conditions: Stomach surgery or weight-loss surgery
- White or Asian descent

Second, SCI itself seems to pose *additional* risks. New spinal cord injuries tend to keep people in bed, and osteoporosis and inactivity go hand in hand. We also know that bearing weight on bones helps keep them strong, but many survivors who use wheelchairs go years without putting much weight on their legs. Also, researchers believe that there is something about the SCI itself – *something in addition* to not being active and not bearing weight. That something is a change in the autonomic nervous and circulatory systems. One reason this is suspected is the speed at which osteoporosis appears. Within days of injury, the body starts dumping out minerals, primarily in the urine. This tells us that bone is being broken down. And, these chemicals are dumped in a *different order* and at a *different pace* than in non-SCI persons on bed rest.

## The Good News:

The rapid bone loss that starts after your injury usually stops at about two years; people injured 30 to 40 years really don't have any more osteoporosis than those hurt less than a decade. And, just because you have osteoporosis, doesn't mean you'll have a fracture. Only about 1% to 6% of SCI persons have brittle-bone related fractures. That may seem to be a lot, but statistically the odds still are in your favor.

## How Do You Diagnose Osteoporosis?

Osteoporosis can be diagnosed through blood work, urinalysis, and high-tech procedures:

- Dual-energy X-ray Absorptiometry (DXA scan) – Measures bone density in the entire body. It is the preferred test for diagnosing osteoporosis and can be done yearly to measure the rate of bone deterioration.
- Single-energy X-ray Absorptiometry – Measures bone density in the arms and legs only
- Ultrasound Bone Density – Measure bone density in the fingers, heels, and leg bones

But doctors don't agree on which test is best or on how aggressively to pursue diagnostics. Why? Too often these tests cost a lot of money and only tell us what we already know: if you have a spinal cord injury, you have some bone thinning.

Frequently they fail to tell us what we *need* to know: will *you* be one of the survivors who actually *have* a fracture. If it turns out that you actually do have a fracture, then your physician may choose to do tests to get a sense of your risk for future fractures and to rule out other possible causes for your fracture.



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## What's the Treatment?

Unfortunately, you probably can't cure osteoporosis. The general consensus is that you can't bring lost minerals back into bones. But, there probably *are* things you can do to help to keep your bones from getting *more* demineralized:

- Increase your physical activity - especially with weight-bearing or resistance exercises. FES bike and the standing frame are not enough.
- If you're a woman who has been through menopause, estrogen supplements might help. If your doctor prescribes these, be faithful in your checkups, for estrogen has side effects.
- For men and women alike, there are other drugs that might be available.
    - Fosamax and all the biphosphates have been proven effective in the general population and is FDA approved for the treatment of osteoporosis. However, you will need to be able to sit up after taking them to prevent reflux.
    - Raloxifene (Evista), Calcitonin, Fluoride, Teriparatide, Denosumab (Prolia) are other drugs commonly used to treat osteoporosis.
- You can eat more calcium - milk, ice cream, shellfish, etc. If you are unable to get enough calcium through your diet, talk with your doctor about starting a calcium supplement. There are different types of supplements; Calcium Citrate is absorbed better in the body.
- Get more Vitamin D – Your body makes vitamin D from sunlight exposure and from the eating foods like fish and green leafy vegetables. Talk to your doctor before taking a supplement.
- Quit smoking. It speeds up bone loss.
- Limit alcohol. It also speeds up bone loss.
- Have good posture – sit up straight.
- Prevent falls.

A few words about *spasticity*: Spasms exert force on bones. Like weight-bearing, this should maintain bone strength. The fact that people without spasticity often have more problems with leg fractures-- and people with spasticity have less -- seems to verify this. However, at the same time, *spasms themselves* have caused bones to break. The message here is that some spasticity is good; too much is bad. Also, if you haven't stood or used your standing frame in several years, check with your practitioner before you stand as you may be at an increased risk for fractures.



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## Standing Watch on the Fracture Patrol:

Sometimes osteoporotic fractures just happen, even without serious trauma. Don't worry too much about this happening to you; be a little more careful. Remember: take your feet out of the heel loops or toe straps on your foot rests before transferring; when in bed, move slowly as you turn or come to sitting if your legs are already bent, crossed, or twisted.

## What If I Think a Bone Has Broken?

Stay calm. Usually a broken bone is not an emergency; you probably do not need an ambulance. When might it be an emergency?

- If you're prone to autonomic dysreflexia and you're having symptoms.
- If you're in incredible pain.
- If the bone has poked through the skin, or if it *hasn't* poked through the skin, but it looks like there's a lot of bleeding *under* the skin.
- If there has been much and rapid swelling.
- If you feel light-headed, nauseated, or otherwise really "crummy."

Even if you decide it's *not* an emergency, call your doctor. You'll need an X-ray as soon as possible. Treat the bone gingerly; *don't* try to line it back up the way it was before. If it's your leg, avoid twisting it more. Elevate it if you can. If it's an arm, keep it positioned in close to your body. Don't struggle into socks, pants, sweaters that will be hard to get off later – but do get enough clothing or blankets on you to stay warm. If you live alone, this would be a good time to call a friend to help you to the doctor's office!

Remember: although osteoporosis and spinal cord injury is a fact of life and the risk is very real, *most survivors are not breaking bones*. Thousands have made it to ripe old ages without fracturing anything. The odds are in your favor.

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