



Osteoporosis and Spinal Cord Injury

What causes a spinal cord injury (SCI)?

Causes of SCI can be grouped as:

- Traumatic
- Non-traumatic

A **traumatic spinal cord injury** is caused by events such as a motor vehicle accident (MVA), a fall or a sports injury.

A **non-traumatic spinal cord injury** may result from arthritis, inflammation or cancer.

How does SCI affect an individual?

SCI's have two main levels of categorization based on:

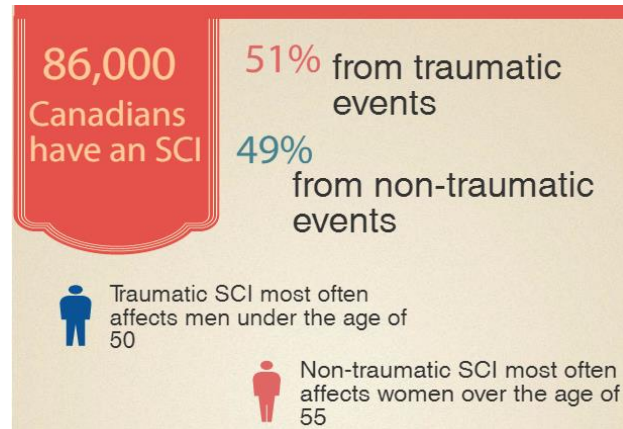
- the number of limbs affected and
- the degree of motor and sensory function that has been lost.

Paralysis affecting the four limbs and chest is termed **tetraplegia**.

Paralysis in the lower trunk and legs is termed **paraplegia**.

An individual who has lost all motor and sensory function of the rectum and affected limbs has a **complete SCI**.

Someone who retains some motor and/or sensory function in the rectum and affected limbs has an **incomplete SCI**.



What's the **LINK** between SCI and osteoporosis?

Regional changes in hip and knee bone mass are routinely observed in people with SCI. The reason is that immediately following a motor complete SCI, there is a 3% per month decline in hip and knee region bone mass. A less distinct pattern of bone loss is seen in people with motor incomplete SCI.

This sudden and rapid loss of bone mass occurs in the first 12 to 18 months following SCI and results in an increased vulnerability to lower extremity fracture over an individual's lifetime.

Such fracture events may occur while an individual is engaging in ordinary activities of daily living, such as transferring in or out of a wheelchair or turning over in bed.

How is osteoporosis diagnosed in people with SCI?

An individual **does not usually know** they have osteoporosis of the hip or knee region **until they experience a fracture**. Health and wellness after SCI requires that a person monitor their bone mass. This can be done by having a bone density test. A doctor's referral is required to have the test.

Wheelchair users will need to visit an accessible location with staff that specializes in testing knee region BMD. It is vital that people with SCI undergo assessment of their knee region BMD in addition to the traditional measures of lumbar spine and hip region BMD. Currently, there are four locations across Canada:

- UHN/Toronto Rehab's Lyndhurst Centre in Toronto, ON
- Hamilton Health Sciences' Regional Rehabilitation Centre in Hamilton, ON
- Foothills Medical Centre in Calgary, Alberta
- Centre Hospitalier de L'Université Laval – CHUL in Quebec City, PQ.

Please click [here](#) for a referral form that you can take to your family doctor.

How can an individual with SCI protect their bone health?

The first step is to find out if you are at increased risk for lower extremity fracture. **If you can answer 'yes' to three or more items in the checklist below then consult with your family doctor and see a bone health specialist in your area.**

Risk Factor Checklist for Lower Extremity Fragility Fracture after SCI:

<input type="checkbox"/> Alcohol intake >5	<input type="checkbox"/> Paraplegia
<input type="checkbox"/> BMI <19	<input type="checkbox"/> Age at injury <16 yrs
<input type="checkbox"/> Female	<input type="checkbox"/> Motor complete (AIS A-B)
<input type="checkbox"/> Prior fragility fracture	<input type="checkbox"/> Duration of SCI ≥10 yrs
<input type="checkbox"/> Family history of fracture	<input type="checkbox"/> Opioid/analgesic use (≥ 10 mg/day for 3 months)
<input type="checkbox"/> Spasticity medication (long-term use)	<input type="checkbox"/> Benzodiazapenes (long-term use)

Good bone health involves a few different areas of intervention:

- ❖ **Lifestyle**
- ❖ **Nutrition**
- ❖ **Education** regarding fracture risk
- ❖ Selection of **appropriate treatment**.

Positive Choices that Affect Bone Health



Factors that Negatively Affect Bone Health



How can an individual with SCI protect their bone health?

Lifestyle and nutrition choices can have a big impact on bone health.

- **Smoking**
- **High caffeine and alcohol intake**
- **A sedentary lifestyle**

All negatively impact bone health.

Quitting smoking, reducing caffeine (< 3 servings/day) and restricting your alcohol intake (< 2 servings/day), and participating in activities that require weight bearing using a standing frame, exoskeleton, walking with long leg brace and forearm crutches, Motored passive cycling and FES biking are positive choices that will benefit your bone health.

Consuming an adequate, but not excessive amount of dietary calcium and Vitamin D supplements also contributes to maintaining healthy bones. For most people with SCI **we recommend 1000 mg/day of calcium**. People with stones in the bladder or kidney may be asked to reduce their dietary calcium intake to 750mg/day. **For most people with SCI, 3-4 servings of calcium rich food per day, as opposed to taking a calcium supplement is ideal.**

Calcium-rich food sources include:

- | | | | | |
|----------|-----------|---------|-----------------|-------|
| *Milk | *Cheese | *Yogurt | *Collard greens | *Kale |
| *Spinach | *Sardines | *Salmon | *Almonds | |

Check your own calcium intake by using the calcium assessment tool [here](#).

For people with SCI we recommend taking **2000 International Units (I.U.) of Vitamin D daily (supplement)** and maintaining a serum 25-OH Vitamin D level of 110nmol/L

Vitamin D-rich food sources include:

- | | | | |
|------------|---|--------|----------------|
| *Milk | *Soy beverages fortified with vitamin D | | |
| *Egg yolks | *Salmon | *Trout | *Cod liver oil |

If you are taking medications, it is recommended to have your Vitamin D levels checked by having a blood test.

If you are diagnosed with low bone mass or with osteoporosis, **consult with your doctor** about treatment options. A number of prescription medications are used to treat osteoporosis, maintain bone mass and reduce fracture risk.



It is also important to prevent falls by knowing how to safely transfer in and out of a wheelchair. Improper or failed transfers to and from the car, the bathtub or the bed are common causes of lower limb fracture in people with SCI. Talk with a physiotherapist or occupational therapist about ways to upgrade your transfer technique.

Resources:

Learn more about SCI and osteoporosis. Organizations like [Osteoporosis Canada](#) and [SCI Ontario](#) have educational material in print and online.