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**.

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

- **Reducing caffeine (<3 servings/day)**
- **Quitting smoking**
- **Consuming an adequate, but not excessive amount of dietary calcium and vitamin D supplements**
- **Restricting alcohol intake (<2 servings/day)**
- **Participating in activities that require weight bearing using a standing frame, exoskeleton, walking with long leg brace and forearm crutches, motomed passive cycling and fes biking**

### Factors that Negatively Affect Bone Health

- **High alcohol intake**
- **High caffeine intake**
- **Smoking**
- **Sedentary lifestyle**
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.

**Resources:**

Learn more about SCI and osteoporosis. Organizations like Osteoporosis Canada and SCI Ontario have educational material in print and online.