

Pain Management

for Patients with Spinal Cord Injury

Pain and Spinal Cord Injury

Pain can be a serious problem for patients with spinal cord injuries (SCI). A common misconception is that a person with an SCI does not feel any pain below their level of injury. This is not true. Pain after a SCI can occur in parts of the body where there is little or no sensation, as well as areas that have normal or intact sensation.

Pain can present in different ways for those living with an SCI, making it challenging to recognize and assess. The pain in areas that have little or no sensation is very real and can negatively affect their quality of life, impact their ability to carry out enjoyable activities, and prevent them from performing their necessary activities of daily living. This can lead to complications such as pressure injuries and urinary tract infections, which in turn can decrease their quality of life. Unmanaged or under-managed acute pain can lead to chronic pain. It is critical for health care providers to understand how patients with a spinal cord injury experience pain and recognize the signs and symptoms so we can help manage their pain as effectively as possible.

This document will highlight the difference between neuropathic and nociceptive pain for patients with an SCI and will focus primarily on neuropathic pain due to its complex nature and direct correlation to SCI.

Purpose of this Resource

The purpose of this document is to provide front line health care providers with an overview of how to assess, identify, and manage the pain of patients with SCIs. It also outlines documentation and patient education. The goal is to support and empower patients to have optimal pain management.

Key Messages:

1. Patients with an SCI still experience pain below their level of injury even though they may have decreased or no sensation.
2. Approximately 50-70% of patients will develop some type of chronic pain after their injury. This may be neuropathic pain, nociceptive pain, or a combination. They may have acute pain in addition to existing chronic pain. These types of pain need to be managed differently.
3. A person with an SCI may experience a significant neuropathic pain response to a minor painful stimulus due to the impaired signal between nerves and the brain.
4. When pain is unmanaged or under-managed, patients with a spinal injury at the thoracic 6 level and above are at risk of Autonomic Dysreflexia.
5. Unexplained new pain or acute pain without an obvious source or acute worsening of neuropathic pain may act as a warning signal or signs of an underlying concern.
6. Use a combination of therapies (non-pharmacological and pharmacological) for a holistic approach for better pain management.
7. Do not stop medications abruptly. Some medications used for neuropathic pain can cause withdrawal symptoms if stopped abruptly.

8. Set pain goals and realistic expectations with the patient. Pain may never completely be eliminated but it can be managed.
9. Engage with the patient, find out their history with pain, how it was previously managed, and if they have their own thoughts on how to best manage their current pain.

Glossary

Acute pain tends to come on suddenly and is caused by something specific. It usually lasts less than six months.

Assertiveness training is a type of therapy that helps patients communicate their needs in a direct and honest way, while respecting the needs of others.

Chronic pain is pain that lasts longer than six months and is experienced after the original pain stimulus has gone away. The pain signal can remain active in the nervous system for months or years.

Functional electrical stimulation (FES) is a “technique that uses electrical current to cause a muscle to contract” where, “the current is then slowly increased until it’s strong enough to make the muscle contract. This level (the smallest current needed to make the muscle contract) will be used for the treatment. It’s important that you actively try to do functional tasks during FES (e.g., grasping and releasing an object).”

Neuropathic pain is caused by damage or injury to the nerves that transfer information between the brain and spinal cord from the skin, muscles and other parts of the body.

Nociceptive pain results from stimulation of pain receptors for tissue injury (nociceptors), which are located mostly in the skin or in internal organs. The injury may be a cut, bruise, bone fracture, crush injury, burn, or anything that damages tissues.

Postural retraining is a type of training that is used to help patients re-learn ideal posture or positioning. It is typically done by a physiotherapist, kinesiologist or personal trainer who has been trained in this area.

Pain Physiology

Pain physiology can be complex however a pain response can be simplified into four basic components.

1. A pain response starts with mechanical, heat, or chemical stimuli that activate pain receptors (nociceptors) in tissue, known as **transduction**.
2. Through the process of **transmission**, the pain stimuli travel up the primary afferent nociceptor to the central nervous system.
3. The pain message then travels to the brain which either up regulates or down regulates the signal to determine if a physical response is needed such as pulling away from exposure to heat, a process called **modulation**.
4. The last phase of the pain response is **perception**, or the person’s conscious awareness of pain to a certain part of the body.

In patients with spinal cord injuries, the process of nerve transduction, transmission, perception, and modulation can become disrupted or dysfunctional at any of these stages, because of the injury to the spinal cord. The body responds differently to a pain response below the level of the injury.

Neuropathic Pain versus Nociceptive Pain

The first step in managing pain is understanding it. Is it nociceptive or neurogenic pain, or both? Is this old pain, new pain, or a combination of both? Understanding what it is can help determine the best way to manage it.

Nociceptive pain results from stimulation of pain receptors for tissue injury (nociceptors), which are located mostly in the skin or in internal organs. These receptors travel to the brain via the spinal cord and respond according to the stimuli. Nociceptive pain can be caused by an injury such as a cut, bruise, bone fracture, crush injury, burn, or anything that damages tissues.

Nociceptive pain in those with an SCI still occurs but if the pain is below the level of the SCI, the body may respond in different ways such as increased spasticity or autonomic dysreflexia.

Neuropathic pain is caused by damage or injury to the nerves that transfer information between the brain and spinal cord from the skin, muscles, and other parts of the body. Normally the pain receptors travel along the nerves to the brain to respond, but after a spinal cord injury, part of that process has been disrupted, causing pain responses to occur in areas that aren't actually affected. Neuropathic pain is commonly described as burning, shooting, electric, or a pins-and-needles sensation. In SCI, neuropathic pain is often described as at-level or below-level of injury. The at-level pain is described as a band like sensation.

A person with an SCI may experience a significant neuropathic pain response to a minor painful stimulus due to the impaired signal between nerves and the brain. **Allodynia** is pain due to a stimulus that wouldn't normally cause pain such as a light touch. Some people may find it difficult to wear thick clothes or use bed linens as even slight pressure can aggravate the pain. A patient dealing with neuropathic pain may not want anything touching their skin, which can severely impact their daily functioning and quality of life.

Pain can vary in type and can present as only neuropathic pain or nociceptive pain or may present as a combination of both.

Additionally, it is important for health care providers to differentiate acute pain from chronic pain. **Acute pain** is defined as pain that comes on suddenly and is caused by something specific. Pain from surgery or stubbing your toe are examples of acute pain. It usually lasts less than six months. **Chronic Pain** is pain that lasts longer than six months. It is often experienced after the

original pain stimulus has gone away; the pain signal may remain active in the nervous system for months or years. Acute pain and chronic pain can exist at the same time. For example, a patient can have chronic neuropathic pain down their arms and now they have an arm fracture causing acute pain. Deciphering which pain is which can be a challenging task.

Assessment

Pain is subjective. An individual's experience of pain is affected by their previous experiences with pain, cultural beliefs on how to express pain, spiritual beliefs, age, gender, ethnicity, socioeconomic status, and support systems.

Unexplained new nociceptive pain (e.g. without an obvious cause) or worsening of neuropathic pain may be a warning signal or sign of an underlying concern. Further investigation and neurological assessment by the patients' physician may be warranted.

It is important to use a patient centered approach when assessing pain. Ask the patient how they typically manage their pain. Is this pain new or different than what they were previously experiencing? Do you have baseline pain? How severe is it and how would it best be described? Examples of pain descriptors include:

- Aching
- Stabbing
- Sharp
- Throbbing
- Muscle Pain
- Cramping
- Nagging
- Electrical or Burning
- Pins and Needles
- Tight, Constant, or Occasional

The 2021 [CanPainSCI](#) guidelines recommend that every patient with an SCI be screened for the presence of pain by any healthcare team member and at regular intervals to monitor changes in pain. The patient should be assessed “for serious underlying conditions (red flags) that may cause, aggravate, or mimic neuropathic pain and that require further investigation and prompt medical review.”

There are several pain assessment tools that can be used. The numeric pain scale, faces pain scale, and verbal descriptor scale are available in Connect Care.

One of the most common assessment tools for pain is the Numeric Rating Scale where the patient rates the severity of their pain on a scale from 0-10, with 0 being no pain and 10 being the worst pain imaginable.

The Faces Pain Rating Scale includes images of faces from smiling to distressed/crying. This scale can be used with patients who are unable to speak, have difficulty communicating (aphasia), or have language barriers.

Management

When managing pain for patients who have lived with an SCI for some time, ask the patient how they manage it at home. They will often have their own individualized self-management plan. Use pain management strategies that align with the patient's goals. Some patients may want to use medication, some may want to try another approach.

An essential component of neuropathic and nociceptive pain management for patients with an SCI is patient education and an open dialogue about what works for the individual. The goal is to empower the patient to build the skills to self-manage as much as possible and to support the patient with an inter-disciplinary approach. A holistic pain management approach that includes a combination of sleep, managing depression, exercise, medication, stress reduction, or alternative treatments, can help to relieve or decrease pain associated with SCI. A team approach including the patient should be taken to prevent or manage secondary complications after SCI such as bowel, bladder, pressure injuries, spasticity, heterotopic ossification, as these may contribute to neuropathic pain.

Other considerations

Mental health concerns such as anxiety and depression are common after an SCI. It is important that the patient's mental health is assessed, and then managed if required. Unmanaged mental health concerns can lead to an increase in neuropathic pain.

It is important to work with the patient to manage potential post SCI complications (e.g., bowel, bladder, pressure injuries, spasticity, heterotopic ossification) as these can aggravate neuropathic pain. Poor sleep can also increase neuropathic pain.

CAUTION! Some common practices for managing pain with heat and cold (e.g. ice, heat, heat lamps, etc.) are **NOT** recommended for patients with SCI. Decreased or lack of sensation can cause burns, frozen skin, or tissue damage. These methods should be avoided.

Unmanaged or Under-managed Pain

When pain is unmanaged or under-managed, patients with a spinal injury at the 6th thoracic vertebrae level and above are at risk of Autonomic Dysreflexia or "AD". AD is syndrome in which there is a sudden rise in blood pressure in response to a noxious stimulus below the level of injury. AD can be life threatening and must be identified treated quickly.

Patients with unmanaged or under-managed pain may also experience an inability to perform activities of daily living. This can lead to medical complications such as pressure injuries and urinary tract infections, which in turn can decrease their quality of life.

Unmanaged or under-managed acute pain can lead to chronic pain. Chronic pain can cause or worsen psychological conditions such as anxiety and depression, having a negative impact on the patient, those around them, and the health care system.

It may be necessary to consult with a pain specialist such as Acute Pain Service, anesthesiology or physiatry. A coordinated, multidisciplinary approach may be necessary to manage pain effectively.

Non-pharmacological considerations

Effective pain management for any type of pain, requires using a combination of therapies and techniques. Non-pharmacological options should also be considered. There are several commonly used techniques to support pain management including:

- Strength training
- Stretching, rolling
- Positioning
- Postural retraining (Physiotherapy)
- Leisure activities / distraction techniques
- Massage
- Hypnotherapy
- Acupuncture
- Assertiveness training
- Community reintegration
- 5 Ps of Energy (Pace, Plan, Prioritize, Position, Problem solve)
- Sleep hygiene
- Stress management (e.g., meditation, mindfulness, music therapy)
- Cognitive behavior therapy (CBT)
- Biofeedback
- Transcutaneous Electrical Nerve Stimulation (TENS)
- Functional electrical stimulation

*Note: Some of the services mentioned above are offered by practitioners who are external to AHS. Due to factors such as legislation, professional regulations, liability, and privacy considerations, external providers may not be able to deliver these services while a patient is receiving care at an AHS facility. As no current provincial policy is in place pertaining to external providers, if a patient or their family requests the involvement of external providers while in the hospital, please:

- ensure that the most responsible healthcare provider overseeing the patient's care is informed,
- inform your charge nurse and/or unit manager and,
- consult Health Profession Strategy and Practice (HPSP) Professional Practice Consultation Service (PPCS) by emailing practice.consultation@ahs.ca
- contact Clinical Legal at: legal.clinical@ahs.ca

Pharmacological considerations

Patients with both nociceptive and neuropathic pain may require management of both types of pain. This will likely require multiple medications as these medicines will work differently on the body.

When treating neuropathic pain, it's important to remember that different medications are used than for nociceptive pain. [CanPainSCI](#) has developed clinical practice guidelines for treating neuropathic pain. First line medications include:

- gabapentin
- pregabalin
- amitriptyline

Gabapentin is an anticonvulsant medication but is commonly used in the treatment of neuropathic pain symptoms. The exact way that gabapentin works to relieve pain is not known but it may change the way the body senses and reacts to pain. Gabapentin is used to manage chronic pain. It is especially good for nerve pain, such as burning, shooting, or stabbing pain. Studies show that pain relief may start within one week and reach a maximum effect in about 4 weeks, therefore is not an immediate pain relief medication. Common side effects include drowsiness, dizziness, fatigue and muscle tremors which are generally worse after starting the medication or increasing the dose. Patient should be warned to not stop the drug abruptly, as it can lead to withdrawal symptoms.

Pregabalin is often prescribed in people whose nerve pain that has not responded to gabapentin. It is structurally related to gabapentin. Pregabalin works by controlling brain chemicals which send signals to nerves to reduce the level of pain the patient is experiencing. Pregabalin has antiepileptic, analgesic, and anxiolytic effects; it is more potent than gabapentin and therefore is used at lower doses.

Amitriptyline is a medication that was first used to treat depression but is now commonly used at low doses to treat nerve pain. Amitriptyline works specifically to relieve nerve pain by 'turning down' increased pain signals to the brain. It corrects the imbalance of certain chemicals in the brain (noradrenaline and serotonin) by stopping them from moving into nerve endings.

Other medications may be introduced according to the clinical status of the patient and clinician preference. Additionally, a prescriber should consider pharmacological treatment for the constellation of symptoms related to chronic pain such as depression, anxiety, insomnia, anorexia, and management of any complications post SCI.

Figure 1 below outlines [CanPainSCI's](#) recommended first and second line pharmacological treatments. It is important to note that prescribers should exhaust the first line treatments prior to moving on to the second line treatments. If second line treatments are prescribed, options can be selected from B, C, D, in the table below in any order.

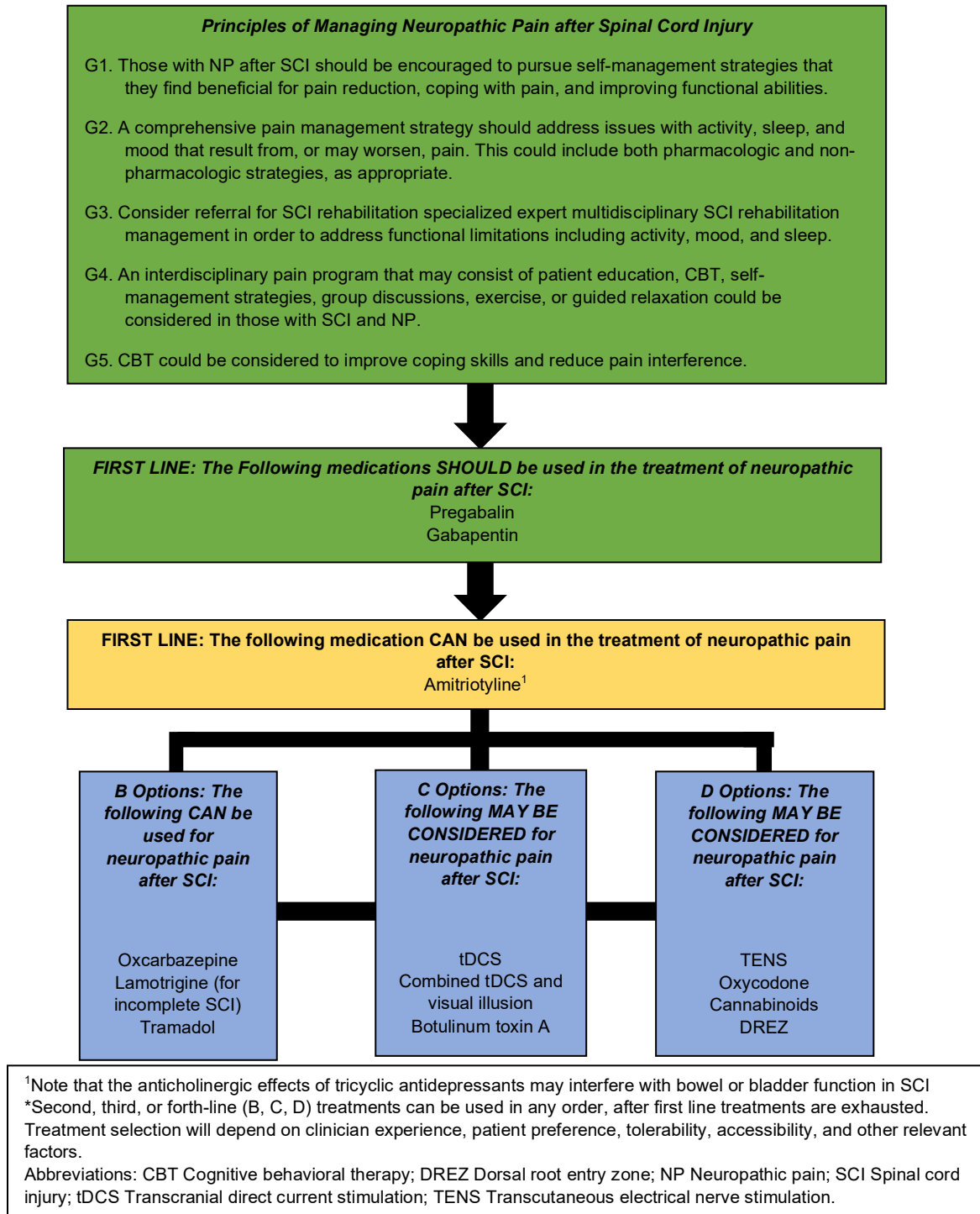


Fig. 1: Principles of managing neuropathic pain after spinal cord injury. Loh, E., Mirkowski, M., Agudelo, A.R. *et al.* The CanPain SCI clinical practice guidelines for rehabilitation management of neuropathic pain after spinal cord injury: 2021 update. *Spinal Cord* 60, 548–566 (2022). <https://doi.org/10.1038/s41393-021-00744-z>. Licensed CC BY 4.0 (<http://creativecommons.org/licenses/by/4.0/>)

*In cases when all or most of these options have been explored and the patient continues to have pain, consider a referral to the chronic pain clinic.

Patient Education

Patients with a new SCI will require education and guidance as they find a pain management regime that works for them. Patients further out from their initial SCI may have an established pain management routine but should still be offered education and resources as required.

There are several online patient education resources on pain and SCI including LivingWithSCI.ca, [Spinal Cord Essential](http://SpinalCordEssential.ca), and MyHealth.Alberta.ca.

The MyHealth.Alberta.ca education resources can be accessed in Connect Care, linked in the Discharge Navigator under Education and attachments. Two resources are currently available:

- [Pain in a Spinal Cord Injury](#)
- [Neuropathic Pain](#)

Documentation

Documenting for all types of pain in one uniform manner can be difficult. The following elements of pain assessment should be included in routine documentation, using the mnemonic

PQRSTU:

- **P**rovoking and **P**alliating factors,
- **Q**uality and **Q**uantity of the pain,
- **R**egion of the body affected,
- if and where it **R**adiates to and if it **R**esolved,
- **S**everity of the pain,
- **T**iming, and
- patient's **U**nderstanding of this pain.

Summary: Concepts to Keep in Mind

1. Although patients with SCI may have no or decreased sensation to parts of their bodies does NOT mean they cannot experience pain in that area.
2. Undermanaged or unmanaged pain may negatively impact the patient's quality of life.
3. Engage with the patient, learn about their history with pain, how it was previously managed, and if they have their own thoughts on how to best manage their current pain.
4. A holistic pain management approach that includes a combination of managing sleep, mood/depression, exercise, medication, stress reduction, or alternative treatments, can help to relieve or decrease pain associated with SCI.

Appendix A: The International Spinal Cord Injury Pain Basic Data Set

The 2021 CanPainSCI guidelines recommend that the International Spinal Cord Injury Pain Basic Data Set (ISCIPBDS) v2.0 should be used as a standardized tool for assessing and documenting pain in patients with spinal cord injury. This tool was created as a data set and is intended to gather more information around how pain impacts the patient and to determine their priorities for pain management.

[The International Spinal Cord Injury Pain Basic Data Set \(version 2.0\) \(nature.com\)](https://www.nature.com/articles/s41591-021-12111-1)

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