Spasticity and Spinal Cord Injury

Spinal Cord Injury Model Systems Consumer Information

For more information, contact your nearest SCI Model System. For a list of SCI Model Systems, go to: *http://www.msktc.org/sci/findms.asp*

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What is spasticity?

Spasticity is the uncontrolled tightening or contracting of the muscles that is common in individuals with spinal cord injuries. About 65%–78% of the SCI population have some amount of spasticity, and it is more common in cervical (neck) than thoracic (chest) and lumbar (lower back) injuries .

Symptoms and severity of spasticity vary from person to person and can include:

- Sudden, involuntary flexing (bending) or extending (straightening) of a limb, or jerking of muscle groups such as in the trunk (chest, back, and abdomen), bladder, or rectum.
- Hyperactive (overactive) reflexes, such as a muscle spasm when you are lightly touched.
- Stiff or tight muscles at rest, so that it is difficult to relax or stretch your muscles.
- Muscle tightness during activity, making it difficult for you to control your movement.

What causes spasticity?

The nerves of the spinal cord and brain form a complex communication circuit that controls our body movements. Information on sensations or processes such as touch, movement or muscle stretch is sent up the spinal cord to the brain. In response, the brain interprets the signal and sends the necessary commands back down the spinal cord to tell your body how to react. The reaction of the body, such as jerking away from a hot object, is a reflex and happens quickly and automatically.

After a spinal cord injury, the normal flow of signals is disrupted, and the message does not reach the brain. Instead, the signals are sent back to the motor cells in the spinal cord and cause a reflex muscle spasm. This can result in a twitch, jerk or stiffening of the muscle.

Just about any touch, movement or irritation can trigger and sustain spasms.

Common triggers are:

- Stretching your muscles.
- Moving your arm or leg.
- Any irritation to the skin, such as rubbing, chafing, a rash, in-grown toenails, or anything that would normally be very hot or cold or cause pain.
- Pressure sores.
- A urinary tract infection or full bladder.

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- Constipation or large hemorrhoids.
- Fracture or other injury to the muscles, tendons or bone below the level of spinal cord injury.
- Tight clothing, wraps or binders.

Spasticity can be irritating, inconvenient or even limit your ability to go through your day.

What are the benefits of spasticity in SCI?

Spasticity is not always harmful or bothersome and does not always need to be treated. Sometimes spasticity can help with functional activities such as standing or transferring. Spasticity that causes your fingers to bend can help you grip objects. Spasticity can also be a signal that you have a medical problem that you might not know about otherwise, such as a urinary tract infection, fracture, or pressure sore.

What problems are caused by spasticity?

- Spasticity can be painful.
- Spasticity can result in loss of range of motion in your joints (contractures).
- Severe spasms can make it difficult for you to drive or transfer safely, or to stay properly seated in your wheelchair.
- Spasticity in your chest muscles may make it difficult to take a deep breath.
- Strong spasms in the trunk or legs can cause you to fall out of your wheelchair when you change position, transfer, or ride over uneven surfaces.
- Repeated muscle spasms at night can cause you to sleep poorly and be tired during the day.
- Spasms can cause rubbing that leads to skin breakdown.
- Spasticity can make movement harder to control, so that activities such as feeding yourself may be more difficult.

Managing spasticity after SCI

First, practice healthy behaviors and good self-care that will help you avoid problems that can increase spasticity, such as urinary tract infections and skin breakdown. Check to see if any of the common triggers listed above may be causing the problem.

Physical treatments

The following treatments will help to maintain flexibility and therefore reduce spasticity and the risk for permanent joint contracture:

- Regular stretching (range-of-motion) exercises twice daily will help maintain flexibility and temporarily reduce muscle tightness.
- Weight-bearing or standing with support, such as using a standing frame or other supportive devices, will help stretch muscles.
- Splints, braces, or progressive casting into the desired position provides continuous muscle stretching that helps to maintain flexibility and a position that does not trigger a spasm.
- Careful use of hot or cold packs. When used in body areas that have partial sensation, check skin tolerance frequently as it may result in a burn if too hot and frostbite if too cold. Avoid the use of hot packs over areas without sensation.

Medications

When physical measures are not enough to control spasticity, medications may be needed.

- **Oral medications**

If spasticity involves large areas of your body, your doctor may prescribe one or more of the following medications:

- Baclofen
- Benzodiazepines (muscle relaxants) such as diazepam, clonazepam
- Dantrolene
- Tizanidine

The effectiveness of these medications varies with each person. Because these medications can have side effects such as fatigue or drowsiness, weakness, nausea, or sometimes low blood pressure, your provider needs to monitor you closely.

- **Nerve or motor point blocks**

If only part of your body has spasticity, anesthetic medications, alcohol, phenol or neurotoxins (such as strains of botulinum toxin) can be injected into the muscles that have spasticity. The medications rarely cause widespread side-effects. The benefits of the injections are only temporary, however, so injections must be repeated a few times a year. These injections can be used alone or in combination with oral spasticity medications.

Surgery

- **Intrathecal medication therapy (also called a "pump" or "baclofen pump")**

Intrathecal drug therapy uses a surgically placed, battery-powered pump and an attached catheter to deliver medication directly into the spinal canal, around the spinal cord (called the "intrathecal" space). The most commonly used intrathecal drug for spasticity is baclofen. Intrathecal baclofen can be used in conjunction with the other treatments listed above. This treatment is generally not recommended until other treatments have been tried and failed to provide relief or if oral medications cause unacceptable side effects.

Advantages of intrathecal baclofen:

- The drug is delivered directly around the spinal cord, so lower doses of medication are needed.
- Fewer negative side effects because the drug does not enter the bloodstream.
- The amount and dosing schedule of drug throughout the day can be precisely set and adjusted by the health care provider to meet each individual patient's needs.
- The pump can be stopped or removed, if necessary.

Disadvantages of intrathecal baclofen:

- You will need surgery to implant the pump and catheter system. Any surgery has risks, such as infection.
- The pump has a limited battery life and will need to be replaced about every 5-7 years.
- You will need to go to your provider periodically for pump refills (done by injecting baclofen through the skin into the pump reservoir).

Mechanical problems with the device may occur and could result in a baclofen overdose or underdose. For this reason, it is important for you to understand the risks, monitor yourself carefully, and get regular follow-up from your provider.

- **Other Surgery**

Other surgical treatments for spasticity are far less commonly performed because they are not reversible. These include cutting a section of the spinal cord (myelotomy) or nerve roots (rhizotomy), or lengthening and transposing a tendon. Your doctor will discuss these surgical options with you if necessary.

Which treatment is best for me?

Discuss your specific needs and treatment options with your health care provider or team. You may need to try different methods, medications, or combinations of treatments before you feel your spasticity is under control. Consider the following questions and discuss them with your provider:

- What are your goals for treatment of your spasticity?
- How important is it that the treatment can be reversed or stopped?
- What are the possible short-term and long-term side-effects of each treatment?
- Are there other health conditions that would influence the treatment choice?
- If you are considering intrathecal baclofen: Will you be able to follow the maintenance requirements? Do you have a good understanding of the possible risks and benefits?

Whatever treatment you choose, you will need to work closely with your treatment provider or team to get the best possible outcome.

What happens to spasticity over time?

In general, spasticity appears to become less bothersome over time. Possibly this happens because people learn to avoid things that trigger spasticity. Changes that naturally go on in the body as you age, such as a slowing down of nerve conduction, may also decrease spasticity. However, an unexplained, sudden or dramatic change in your spasticity level may sometimes signal a problem, so let your health care provider know immediately.

Source

Our health information content is based on research evidence whenever available and represents the consensus of expert opinion of the SCI Model System directors.

Authorship

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Disclaimer

This information is not meant to replace the advice from a medical professional. You should consult your health care provider regarding specific medical concerns or treatment.