

# Spasticity and Traumatic Brain Injury

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TBI Fact Sheet

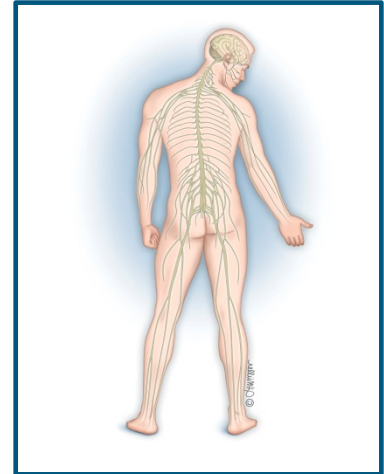
*This fact sheet tells you about how to manage spasticity (muscle tightening) after your brain injury.*

## What is spasticity?

Spasticity is the uncontrolled tightening (increased muscle tone) caused by disrupted signals from the brain. It is common in persons with severe brain injuries (TBI). People with spasticity may feel as if their muscles have contracted and will not relax or stretch. They may also feel muscle weakness, loss of fine motor control (for example, being unable to pick up small objects), and overactive reflexes.

## What you need to know

- Many people with TBI either do not have spasticity or have easily controlled spasticity.
- Your brain injury may cause the muscles in your body to become stiff, overactive, and difficult to stretch. The muscle may “spasm” or tighten suddenly. Doctors call this effect spasticity (pronounced spas-TIS-it-ee).
- Spasticity may not be bothersome and does not always need treatment.
- Spasticity may come and go. It may be worse during certain activities or it may become worse at night. It can interfere with sleep or limit the ability to function. When problems such as these arise, there is more need to consider treating it.
- Severe spasticity may cause almost continuous spasms and can cause permanent shortening of muscles, making even simple movements difficult.
- There are ways to treat spasticity or relax muscles, ranging from controlling triggers to taking medicines.
- When only a few muscles are affected, focal treatments such as nerve blocks and botulinum toxin injections (described below) may be considered. There may also be surgery options.



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## Understanding Your Body: How Muscles Work

Your brain communicates through your spinal cord and nerves to your muscles and causes them to contract and relax. After brain injury, the messages between brain and muscles may become unregulated leading to unwanted muscle contractions.

## What are the symptoms of spasticity?

The symptoms and degree of spasticity are different in each person and can include:

- Sudden, involuntary tightening or relaxing of a limb, or jerking of muscles in the trunk (chest, back, and abdomen).
- Hyperactive (overactive) reflexes, such as a muscle spasm when the arm or leg is lightly touched.
- Stiff or tight muscles at rest, so that it is difficult to relax or stretch. This is more pronounced than normal muscle tightness when a person sits for a long period of time. In spasticity, the tightness is so high that it is difficult to stand or walk.
- Muscle tightness during activity, making it difficult to control movement.

## When am I most likely to experience symptoms?

Spasticity can happen at any time, but is most likely to occur when you:

- Stretch or move an arm or a leg.
- Have a urinary tract infection or a full bladder.
- Have constipation or large hemorrhoids.
- Have an injury to the muscles, tendons, or bones (including bone fractures).
- Wear tight clothing or wraps.
- Feel emotional stress.
- Have any kind of skin irritation\*

(Skin irritation includes rubbing, chafing, a rash, in-grown toenails, or a skin sensation that is too hot, too cold, or causes pain. This also includes pressure sores or ulcers caused by staying in one position for too long.)

## Does spasticity need to be treated?

Spasticity is not always harmful or bothersome and does not always need to be treated. Sometimes, however, there are problems caused by spasticity that can be bothersome or harmful.

Problems caused by spasticity include:

1. Pain when muscles tighten.
2. Limited motion, especially in joints that can limit walking or moving in and out of beds or chairs.
3. Difficulty taking deep breaths.
4. Falls
5. Poor positioning in a chair, wheelchair, or bed.
6. Poor sleep and tiredness during the day.
7. Skin pressure ulcers.
8. Difficulty maintaining proper hygiene.
9. Limits on normal activities such as feeding or grooming.
10. Limited use of your hands.

## What can I do to manage my muscle spasticity?

Urinary tract infections and skin breakdown can be avoided by keeping skin clean, wearing loose clothing, and changing positions regularly. Taking extra care when moving from a chair or bed can also help keep triggers from occurring. Other triggers such as constipation or large hemorrhoids can be avoided by eating a high fiber diet and drinking plenty of water. Even though stretching can sometimes be a trigger of spasticity, daily stretching can actually help you maintain flexibility. Sometimes, wearing splints can keep spasticity from becoming worse.

## Coping with Spasticity through Physical Treatments

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

1. Regular stretching (range-of-motion) exercises will help maintain flexibility and temporarily reduce muscle tightness in mild to moderate spasticity.
2. Standing with support, often with the help of braces, will help stretch muscles.
3. Splints, braces, or progressive casting into the desired position provides continuous muscle stretching that helps to maintain flexibility; ideally it is a position that does not trigger your spasticity.
4. Careful use of cold packs or stretching and exercise in a pool may help.

It is important to get the advice of a physician or therapist on what physical treatments are correct and safe.

## Oral Medication

Medication may help control spasticity but may have side effects, and is probably most useful when you have spasticity in several parts of your body. Common side effects, such as sleepiness, might be more intense after a brain injury. You should discuss the benefits and side effects of various medications with a physician. Appropriate medications may include:

- Baclofen (Lioresal®)
- Dantrolene (Dantrium®)
- Tizanidine (Zanaflex®)
- Benzodiazepines such as diazepam (Valium®) or clonazepam (Klonopin®)

## Focal Interventions

Sometimes a person may have side effects to oral medication or may only have spasticity in a single location. For those types of spasticity, anesthetic medications, alcohol, phenol (pronounced FEE-noll), or neurotoxins (such as botulinum toxin, Botox®, Dysport®, Xeomin®, Myobloc®) can be injected into the muscles and nerves (usually in the arms and legs) to reduce unwanted muscle hyperactivity to control spasticity in local areas. These injections rarely cause widespread side effects and do not affect the brain or spinal cord. The benefits of the injections are temporary, so they must be repeated several times a year. These injections require regular stretching to be most effective. Injections can be used safely in combination with other spasticity management.

## Intrathecal Baclofen (ITB) Pump

Intrathecal baclofen pumps are small hockey-puck sized devices that release tiny amounts of baclofen into the space around the spinal column. Baclofen is the most commonly used medication for spasticity. Intrathecal baclofen (pronounced in-TRAH-theh-cal BAK-loh-fen) pumps can be especially helpful after a traumatic brain injury. A surgery is performed to implant a small battery-powered computer and pump, usually in the patient's abdomen. Intrathecal baclofen can be used along with other spasticity treatments. Like other treatments, this pump can reduce the frequency and intensity of spasms. It has the advantage of maximizing the beneficial effects of baclofen with fewer side effects than taking baclofen by mouth.

Although rare, there are serious risks associated with intrathecal baclofen and it is important to discuss the risks with your physician and comply with careful monitoring.

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## Authorship

*Spasticity after Traumatic Brain Injury* was developed by Kathleen Bell, M.D. and Craig DiTommaso, M.D., in collaboration with the Model Systems Knowledge Translation Center.

**Source:** Our health information content is based on research evidence whenever available and represents the consensus of expert opinion of the TBI Model Systems.

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