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## Controlling Spasticity in MS

*Managing Specific Issues*



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On the cover:  
A physical therapist works  
with a patient with MS in the  
Neuroscience and Restorative  
Care Center at Mount Sinai  
Hospital in New York City.  
Photograph by Bill Stanton.

## Controlling Spasticity in MS



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Reviewed by members of the Client Education Committee of the National Multiple Sclerosis Society's Medical Advisory Board.

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*By Nancy J. Holland, EdD  
with Serena Stockwell*

# Introduction

Spasticity is one of the most mysterious of all MS symptoms. It comes and goes. It feels different to different people—and even to the same person at different times. There are even occasions when a physician finds spasticity, but the person affected has no symptoms. There's also an inherent paradox. Spasticity is not all negative. The stiffness it may give the legs can be a real help in moving about or transferring from bed to chairs, to car seats, on and off a toilet, and more.

## What is spasticity?

The word spasticity refers to involuntary muscle stiffness or spasms (sudden muscle contractions).

In any coordinated movement, some muscles relax while others contract. Spasticity occurs when this coordination is impaired and too many muscles contract at the same time. MS-related spasticity can cause a leg to lock up and refuse to bend.

Spasticity is not completely understood. Doctors believe the problem is caused by increased sensitivity in the parts of muscles responsible for tightening, relaxing, and stretching. This likely occurs as a result of demyelination of the nerves connected to these muscles. This may lead to excessive firing of the nerves that control muscles.

In mild cases, the condition is noticeable only as a feeling of tight or stiff muscles. When the condition is severe, the

person can experience painful spasms or twisted limbs, which can impede mobility and other physical functions.

There are two types of MS-related spasms: flexor and extensor. Flexor spasticity is defined as an involuntary bending of the hips or knees (mostly involving the hamstring muscles on the back of the upper leg). The hips and knees bend up toward the chest. Extensor spasticity is an involuntary straightening of the legs. Extensor spasticity involves the quadriceps (muscles on the front of the upper leg) and the adductors (inner thigh muscles). The hips and knees remain straight with the legs very close together or crossed over at the ankles.

### **How common is spasticity?**

Spasticity is one of the more common symptoms of MS. If all degrees of spasticity are taken together, it occurs in an estimated 80 percent of people with the disease. The question of degree is important. For one person, spasticity may cause a stiff leg, while in another, it makes walking impossible. For many people, the extra effort needed to move around when muscles are spastic contributes significantly to fatigue. On the other hand, spasticity can also compensate for muscle weakness, making it easier to stand, walk, and move. Spasticity may also occur in the arms. Although this is less common in MS, it can significantly interfere with use of the hands in important activities such as bathing and eating.

## **Treatment**

### **The treatment partnership**

Because the condition is so individual, successful treatment of spasticity demands a true partnership between you and your doctor, nurse, physical therapist, and/or occupational therapist. Your family also plays an important role. The first step in building a good treatment partnership is knowing that treatment strategies are possible.



“Treating spasticity is not a matter of the doctor writing out a prescription for pills and saying come back in three months,” said Charles R. Smith, MD, former director of the Multiple Sclerosis Comprehensive Care Centers at White Plains Hospital in White Plains, New York, and at Bronx Lebanon Hospital in the Bronx, New York.

A doctor can identify the presence and degree of spasticity by stretching your legs to check for involuntary resistance. For example, if your leg is spastic, your muscles will automatically resist when the doctor quickly bends your knee. If spasticity is mild, the doctor will feel barely any resistance; if the spasticity is severe, your leg may be so stiff that the doctor cannot bend it at all.

Treatment begins with the doctor recommending ways to relieve the symptoms. Strategies may include medication, exercise, or changes in daily activities. To individualize the plan, and to adjust the dosage of any medication to its most effective level, your doctor will need to follow your progress. She or he may also make referrals to other health-care professionals, such as a physical therapist (PT) or occupational therapist (OT).

Nurses normally have responsibility for health education and for learning in detail how patients’ daily lives are affected by their symptoms and are an important part of this process. Take the time to ask your nurse questions and provide personal information. Both your doctor and nurse will guide you through the sometimes tricky process of medication adjustment. In addition, the PT and OT can provide individualized training with specific exercises and ways to make daily activities easier.

## Self-help

Spasticity, like other aspects of your MS, is in many ways unique to you. As with other MS symptoms, it tends to come and go and to be worse under certain conditions. Typical triggers include cold temperatures, high humidity, tight clothing, tight shoes, constipation, poor posture, and having a viral infection such as a cold or the flu, or a bacterial infection including skin sores or bladder infections.

In time you will become aware of the triggers that affect you most. Some, like tight shoes, can be avoided. Others triggers merit an intervention.

### Effective self-help means:

- Don’t assume that nothing can be done! Spasticity does not have to be tolerated. Improvement is usually possible.
- Make sure an appropriate exercise program is a regular part of your routine. The National MS Society’s illustrated booklets *Stretching for People with MS* and *Stretching with a Helper for People with MS* include exercises specifically for spasticity. Ask your physical therapist, nurse, or doctor for suggestions.
- Explore complementary relaxation techniques such as progressive muscle relaxation, yoga, meditation, or deep-breathing exercises. None of these is a cure, but they can make it easier to sleep at night and face the next day’s problems with a clearer head and reduced spasticity.

- If your doctor agrees, explore massage. You may even receive some insurance reimbursement depending on your plan. Massage can help relax muscles and enhance range of motion and may be helpful in preventing pressure sores. Massage should not be used if pressure sores or reddened areas of skin are present. The American Massage Therapy Association has a national locator service and can supply names of qualified therapists. Call 877-905-2700 or visit their Web site at [www.amtamassage.org/findamassage/locator.htm](http://www.amtamassage.org/findamassage/locator.htm).
- Be patient but persistent through adjustments in daily activities, the types and doses of medication, the type and timing of exercise, and the use of devices, gadgets, and adaptations.

## Treatment goals

Spasticity interferes with daily activities, so the primary goal of treatment is to reduce the negative effects as much as possible. Sections of this booklet detail what can be accomplished by medication, physical therapy, orthotic devices (splints or braces), and occupational therapy. Some strategies seek to relieve the affected muscles; others involve learning to work around spasticity by adopting new ways to do things.

Treatment also aims at preventing the serious complications of spasticity. These include contractures (frozen or immobilized joints) and pressure sores. Since these complications also act as spasticity triggers, they can set off a dangerous escalation of symptoms. In fact,

surgical measures are considered for those rare cases of spasticity that defy all other treatments.

Contractures are not only painful and disabling, but if left untreated, they become permanent, leaving legs that can never be straightened and limiting joint mobility in such places as the shoulder. Treatment (and prevention) of contractures usually combines treatment of spasticity with medication and physical therapy, prescribed and tailored to the individual by the physician.

## Pressure Sores

### About pressure sores

Pressure sores, sometimes called bed sores, or pressure ulcers, occur in people who spend much of their day sitting or lying down. The term, “bed sore,” is misleading. One does not need to be in bed all the time to be at risk for a pressure sore. MS reduces the thousands of small movements people ordinarily make both in sleep and while sitting down. MS can dull sensation in the buttocks or legs, eliminating the usual sensory cues for shifting position.

Spasticity contributes to pressure sores by making normal movement more difficult and by causing posture changes that create pressure points. Another cause of pressure sores is “shearing,” which occurs when the person is receiving positioning assistance from someone, and the movement is more sliding or dragging than lifting.

Pressure sores begin innocently enough, as small reddened areas. The spot may not even feel painful or tender. However, there may already be significant damage to the soft tissues underneath reddened areas of skin. If pressure on the area is not relieved, the skin will break down, forming a sore. These sores can deepen quickly. They are prone to infection, and they can eventually destroy large areas of underlying tissue and even bone. Your nurse or doctor can provide instruction in prevention and early detection. Controlling spasticity is part of good pressure sore prevention. Complicated infected pressure sores are contributing factors in some MS-related deaths.

## Rehabilitation

### Physical therapy

A physical therapist (PT) recommends and teaches specific exercises and movements that can increase flexibility and relieve spasticity. First, you will have several tests that measure muscle tone, resistance, strength, and coordination. You'll also be asked about your general functioning in routine daily activities.

In addition to stretching exercises you do yourself, PTs also relieve spasticity with specific exercises (done with the help of another person) to stretch and relax shortened muscle fibers, increase joint movement, extend contracted muscles, and improve circulation. Some of these

techniques may be taught to a family member or helper so that they can be performed on a routine basis at home.

Strengthening exercises prescribed by the PTs are also important because a muscle that is spastic is not necessarily strong.

Physical therapy can help maintain range of motion to prevent contractures. Strengthening the spastic muscles, and those that oppose the spastic ones, may be particularly beneficial. This is like making sure that both the “push” and the “pull” are in good condition.



PTs may also recommend hydrotherapy (therapy using water) and local application of cold packs. Hydrotherapy is a very effective way to temporarily relax spastic limbs, especially when used in combination with gentle stretching.

For those who are unable to stand independently, a standing frame allows for stretching of leg muscles, as well as pressure on the leg bones, which helps limit bone mineral loss (osteoporosis).

## Orthotic devices

Orthotic devices (such as braces and splints) maintain the extremity in a better position, which makes it easier to move around or get into a more comfortable position. They should be fitted by a professional. A common example is the ankle-foot orthosis (AFO—which places the ankle in a better alignment). Although many drugstores and catalogs offer them over-the-counter, ill-fitting devices can aggravate spasticity and cause pressure sores or pain. Trained PTs can direct you to the best options and teach you how to use them.

## Occupational therapy

Occupational therapists (OTs) are experts in modifications that make daily life with spasticity more comfortable and enhance independence. That might include replacing small drawer pulls with large knobs, spraying drawer tracks with silicone to make the drawers

glide, or lowering the clothes bar in your closets. OTs will recommend assistive devices and let you try out samples. You may be amazed at the ingenuity of the available devices.

### Here is a small sample:

- **Dressing aids:** These include sock pullers, long shoehorns, and shoe and boot removers, all of which help you dress with a minimum of bending. There are elastic shoelaces that let you slip in and out of shoes without having to retie them, zipper pulls with long handles, and more.
- **Toiletry and grooming aids:** In addition to electric shavers and electric toothbrushes, there are easy-grip handles for shaving-cream cans, combs, or brushes, and palm or wrist cuffs to hold either regular bath brushes or bent-handled brushes, to extend your reach.

For people who use wheelchairs, OTs may also recommend positioning changes that minimize spasticity. Sometimes simple adjustments in the height of a footrest or the width of a seat can make a world of difference. OTs can also develop exercise programs for your hands and arms, and may recommend splints that position the hands for best functional use.

# Medications

## Drug therapy

There are two medications approved for the treatment of spasticity and other medications that can serve well in certain situations. The most effective dosage will depend on striking a balance between the drug's good and bad effects. An effective dosage tends to vary from time to time. An infection, cold weather, an ingrown toenail—whatever triggers your spasticity—will also influence the amount of medication needed to control it.

Typically, the doctor will increase the dose of medication gradually until the full benefit is evident, and reduce the dose if side effects occur. In addition, people on your health-care team can suggest timing your medication in specific situations. For example, taking an antispasticity medication an hour before sexual activity can prevent painful spasms during orgasm.

### Baclofen

Baclofen (Lioresal®) is a muscle relaxant that works in the spinal cord. It is most often taken three or four times a day, and common side effects are drowsiness and muscle weakness. Baclofen relaxes normal as well as spastic muscles. Nausea, a less common side effect, can usually be avoided by taking baclofen with food. The drug has a good safety record with long-term use. The side effects don't build up or become worse over time. At high doses, this medication reduces concentration and contributes to fatigue.

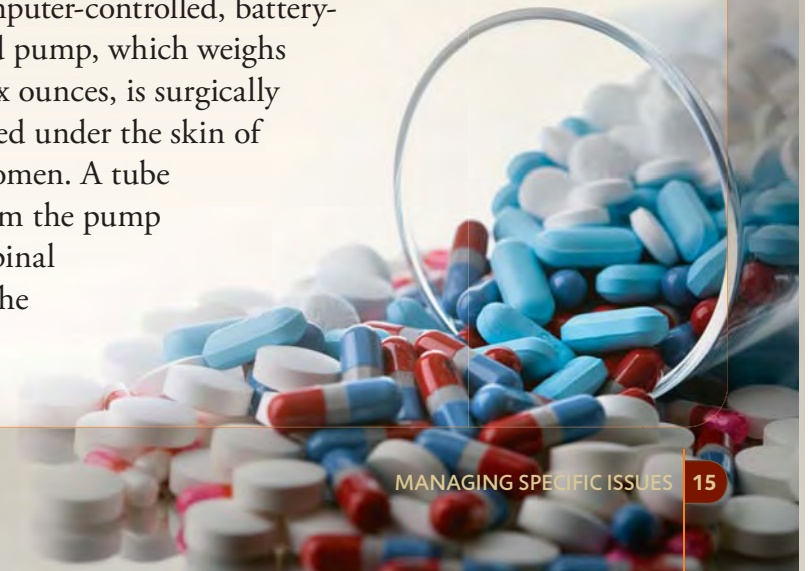
Because it usually restores flexibility within a short period, baclofen may allow other treatment, such as physical therapy, to be more effective. Baclofen does not cure spasticity or improve coordination or strength. A gradual increase in dosing often allows for higher and more effective doses to be taken. It should not be greatly reduced or stopped suddenly without consulting with your physician.

### “Intrathecal” baclofen

Some people require a higher dose of baclofen but cannot tolerate the increased side effects. A surgically implanted pump can administer very small amounts of the drug directly and continuously to the spinal cord (specifically, to the fluid which surrounds the cord).

The baclofen pump has been extremely successful. The pump can improve (or at least maintain) a person's level of functioning. It may even help some people remain ambulatory. And it permits people with very limited mobility to be positioned to minimize pain and the risk of skin breakdown.

The computer-controlled, battery-operated pump, which weighs about six ounces, is surgically implanted under the skin of the abdomen. A tube runs from the pump to the spinal canal. The pump is



programmed to release a pre-set dose specific for the individual. People who use the pump are seen by their physician or nurse for a new drug supply and a check of the computer program every one to three months. New drug is injected into the pump through the skin. The little computer can be reprogrammed painlessly by radio signals. When the battery wears out (in three to seven years) the pump itself is surgically removed and replaced. The tube remains in place.

### **Tizanidine**

Tizanidine (Zanaflex®) works quickly to calm spasms and relax tightened muscles, but may cause greater sedation than other medications. Tizanidine is typically taken three times a day. In addition to drowsiness, dry mouth is a common and usually temporary side effect. Hypotension (low blood pressure) is another potential side effect although less frequent.

This drug also has a good safety record with long-term use. It does not cure spasticity or improve muscle coordination or strength. A combination of baclofen and tizanidine may give the best results. Tizanidine should be used with caution with ciprofloxacin HCl (Cipro®), which is used to prevent or treat urinary tract infections, since increased drowsiness or sleepiness can occur.

### **Diazepam**

Spasticity can also be treated with diazepam (Valium®), generally in small doses. This drug is not as effective as those mentioned above, but it has the benefit of relieving

anxiety, making it easier for someone who is restless or has disturbing night-time spasms to relax and get a good night's sleep.

Drowsiness and potential dependency with long-term use make diazepam a less desirable choice. However, in some circumstances, diazepam and another antispasticity drug may be prescribed together. People for whom this works say that they would rather be a bit sluggish and fully flexible than wide awake and spastic. Clonazepam (Klonopin®), can also help control spasms, particularly at night.

### **Gabapentin**

Gabapentin (Neurontin®) is used to control some types of seizures in epilepsy. In MS it controls certain types of pain and can reduce spasticity. The most common side effects include blurred or double vision, dizziness, and drowsiness. Once you've started on it, gabapentin should not be stopped without consulting your physician.

### **Dantrolene**

Dantrolene sodium (Dantrium®) is generally used only if other drugs (alone or in combination) have been ineffective. It works by partially paralyzing muscles, making it a poor choice for people who walk. Dantrolene can produce serious side effects, including liver damage and blood abnormalities. The longer a person takes this drug, the more these problems are likely to develop. People taking dantrolene must have periodic blood tests.

### **Levetiracetam**

Levetiracetam (Keppra®) is another drug used for seizure control in some forms of epilepsy. In MS, it can sometimes be helpful in improving spasticity and spasms. Side effects and treatment considerations are similar to those seen with gabapentin.

### **Botulinum toxin**

Injection of botulinum toxin (Botox®) has been shown to help spasticity. However, the benefit is limited to the injected muscles, and the treatment must be repeated every three to six months. Only small amounts of the drug can be injected into the body at any one time. Otherwise, the immune system might create antibodies against it. For these reasons, Botox is not a good choice when many muscles are spastic or the spastic muscles are large. It is a very good choice when muscles of the arm are spastic, as these muscles are small and do not require a lot of medication. Side effects include weakness of the injected muscle and some nearby muscles, and a brief “flu-like” syndrome. Despite the drug’s effectiveness, the FDA has not yet approved Botox for MS-related spasticity, and the drug is very expensive.

### **Phenol**

Another treatment is the injection of a nerve block called phenol. This treatment also needs to be repeated every three to six months, and is often effective when oral agents have had unsatisfactory results.

## **A Final Option**

### **Severe Spasticity**

Enormous progress has been made in controlling spasticity in the past two decades. If none of the treatments discussed above have helped, surgery might be recommended for relief. The relief is permanent, but so is the resulting disability. The techniques include severing tendons (tenotomy) or nerve roots (rhizotomy) in order to relax cramped-up muscles. These measures are only undertaken after serious consideration and for the most difficult cases of spasticity.

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