

Spasticity and spasms

Fact Sheet

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Spasticity and spasms

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Contents

1. What are spasticity and spasms?	1
2. Managing spasticity and spasms	4
3. Getting the most from medication	6
4. Measuring the impact of treatment	10
5. References	11





Spasticity and spasms are symptoms often associated with multiple sclerosis. However, to ensure people with MS and health professionals communicate effectively, it is vital to appreciate what the terms spasticity and spasms describe as misunderstandings can occur. For instance, someone might describe their symptom as a 'spasm', using the term to mean a sudden wave of pain, where a health professional would understand the word to mean a sharp contraction of a muscle. Unless the meaning is properly explored and any confusion resolved between the popular use of a word and its medical definition, it could lead to a doctor prescribing medication that will have little or no effect on the individual's symptom.

1. What are spasticity and spasms?

Spasticity can be described as involuntary muscle stiffness and spasms as involuntary muscle contractions. Any muscle can be affected but spasticity and spasms tend to predominantly affect a person's limbs or trunk.

People with spasticity describe their muscles as feeling stiff, heavy and difficult to move. When very severe it can be very difficult to bend a limb at all. If a limb becomes fixed in one position it is known as a contracture.

Different types of spasm¹

Spasms	
Flexor spasms The limb bends upwards towards the person's body	 A stick figure with a pink torso and head. The right leg is bent upwards towards the body, illustrating a flexor spasm.
Extensor spasms The limb extends away from the person's body	 A stick figure with a pink torso and head. The right leg is extended straight out away from the body, illustrating an extensor spasm.
Adductor spasms The limb pulls inwards towards the person's body. Commonly a person experiences this as difficulty separating their thighs	 A stick figure with a pink torso and head. The legs are pulled together towards the midline of the body, illustrating an adductor spasm.
Spasms affecting the trunk The back or trunk can arch off a bed or away from the back of a chair	 A stick figure with a pink torso and head sitting on a chair. The back is arched away from the chair's backrest, illustrating a spasm affecting the trunk.

Why these symptoms occur

Nerve pathways connecting the brain, spinal cord and muscles, work together to coordinate movements of the body. These pathways can be disrupted in multiple sclerosis and can lead to loss of coordination, over-activity and / or weakness of muscles.

Spasticity and spasms can range from mild to severe and can vary over time, even throughout one day. People can describe the symptoms as annoying, uncomfortable and unpredictable, although they can also be helpful. Some people use the stiffness of their spasticity or extensor spasms to assist them when walking or in transferring from bed to chair.

Other associated symptoms

Other features that may be associated with spasticity and spasms can include pain, weakness and clonus.

- **Pain**

Spasticity and spasms are not always painful. If pain is present it can be described as a 'tugging' of the muscles and can be as a direct result of the sudden spasm movement or the constant feeling of stiffness. Sometimes spasticity and spasms can lead to altered sitting and lying positions which can also lead to pain and discomfort.

- **Weakness**

Although a limb with spasticity is stiff and can resist movement, some of the muscles may also be weak. It can seem paradoxical to have some muscles that are stiff and others that are weak, but this results from different nerve pathways being disrupted. The co-existence of spasticity and weakness can be challenging to manage as drugs can minimise spasticity but not weakness. Sometimes when a person's stiffness is reduced they feel their existing weakness is more prominent.

The feeling of weakness is often described by people with the term 'heavy'. Confusingly this word can also be used to describe stiff limbs.

To assess whether the heaviness is from weakness or spasticity, it may be necessary for the health professional to bend and straighten the limb. This is described as 'moving the limb through its full range of motion'. A limb will resist being moved if spasticity is present. If weakness is present, although it may feel cumbersome and weighty, the limb will move more easily.

- **Clonus**

This is a repetitive, up and down movement, often of the feet. It is often observed as a constant tapping on wheelchair footplates. Individuals often find their own ways to minimise this symptom such as lifting the limb, or leaning forward in the chair to pass weight through the leg.

Fatigue and loss of dexterity can also be associated with spasticity.

What is tone?

Spasticity is sometimes described as increased muscle tone. Muscle tone is the resistance felt when an arm or leg is moved or stretched. Normal tone occurs when an individual is relaxed and the health professional can bend and straighten the limb without difficulty. An increase in tone can be due to spasticity, spasms and or changes in muscles, tendons and ligaments as a result of disuse, or altered lying and sitting postures.

2. Managing spasticity and spasms



Managing spasticity and spasms is a balance between minimising the negative aspects and maintaining their usefulness, such as providing support to weak muscles. Key to any long-term management plan is the need for movement or stretching and the ongoing management of trigger factors.

Movement and stretching

It is important to keep muscles, ligaments and joints as flexible as possible. This can be done through stretching, active movement (where the individual moves their own limbs) or passive movement (where limbs are moved by a physiotherapist or automated exercise machine). A physiotherapist can advise on how to maintain flexibility, teach specific stretches, and ways of moving and positioning the body to prevent contractures.

Similarly it is important to maintain good sitting and lying postures. This can be assisted by adapting equipment such as wheelchairs and using aids to improve sleep positions. Experts who can advise include specialist seating services, physiotherapists and occupational therapists.

Optimising sitting postures¹

Poor positioning in sitting	Good positioning in sitting
	 <p data-bbox="831 1883 1337 1957">Hips and bottom at the back of the seat, knees and feet at right angles</p>

See also *Are You Sitting Comfortably..?*, the MS Trust's book on posture when sitting.

What can be done and who can help

Whether symptoms are mild or severe, medical, physiotherapy, nursing and occupational therapy treatment, advice and education can help increase understanding of spasticity. Increasing knowledge about spasticity and what triggers it can help people manage it more effectively and prevent symptoms.

Certain factors are known to exacerbate spasticity and spasms.

Trigger factors ¹	Who can give management advice
<ul style="list-style-type: none">• Urinary infection or retention• Bowel impaction, constipation, infection• Red or broken skin/pressure areas, ingrown toenails	<p>Sometimes spasticity and spasms become harder to manage; a review of bladder, bowel and skin care management techniques may improve the situation.</p> <p>A GP, nurse specialist, continence advisor and / or district nurse can give advice and assistance to effectively manage bladder, bowel and skin.</p>
<ul style="list-style-type: none">• Pain• Infections	<p>Pain and infection will aggravate spasticity. Locating and treating the source of the pain or infection eg skin infection or an ingrown toenail, may reduce the spasticity. Advice can be sought from a GP or district nurse.</p>
<ul style="list-style-type: none">• Tight fitting clothes or splints	<p>Simply loosening tight garments may help to relieve spasticity. If splints are causing discomfort or skin irritation then they will need reviewing by an orthotic or therapy service.</p>

In summary, the ongoing need to incorporate movement, stretching and good sitting and lying postures together with managing trigger factors cannot be over emphasised. However, sometimes it is necessary to complement these strategies with the use of drugs.

3. Getting the most from medication

The effective use of drugs can be an invaluable part of how a person manages their spasticity. When commencing any drug it is best to start with a low dose and gradually increase it, until a level is reached that helps the symptom but has minimal side effects. The oral drugs available (listed below) can be used in combination, but usually a doctor will maximise the effect of one drug before prescribing it with others. The doses indicated are only a guide. A doctor will recommend the dose of specific drugs and, where necessary, suggest how to increase the dosage.

It is important to consider the best time to take these drugs during the day. For instance, if getting out of bed is difficult, it could be beneficial for someone to have their drugs next to the bed, take them when they wake up and wait 10 - 20 minutes before getting up.

Available oral drugs

The NICE Guideline² states that the first line of treatment should be baclofen or gabapentin. The other drugs in the list should only be given if this treatment is unsuccessful or side effects are unmanageable.

Baclofen

Site of action - Directly on nerve cells, mainly in the spinal cord,

Initial and maximum doses - Initial dose 5-10mg once or twice a day.

Maximum dose 120mg. Baclofen works for between four and six hours so needs to be taken regularly through the day.

Side effects - Should not be stopped abruptly as this can induce seizures.

Side effects can include weakness, drowsiness and dizziness

Gabapentin

Site of action - Central nervous system

Initial and maximum doses - 100-300mg daily up to a maximum of 2400mg

Side effects - Drowsiness, dizziness

Tizanidine

Site of action - Central nervous system

Initial and maximum doses - 2mg daily up to a maximum of 36mg

Side effects - A doctor will initially recommend regular blood tests to ensure tizanidine does not have any adverse effects on liver function. It can also cause drowsiness and a dry mouth

Diazepam

Site of action - Central nervous system

Initial and maximum doses - 2mg daily up to a maximum of 40-60mg

Side effects - As a prominent side effect is drowsiness, this drug is best taken at bedtime. Side effects include reduced attention and memory impairment. Should not be abruptly stopped as this can cause withdrawal effects

Clonazepam

Site of action - Central nervous system

Initial and maximum doses - 0.25-0.5mg daily up to a maximum of 3mg

Side effects - As a prominent side effect is drowsiness this drug is best taken at bedtime. Side effects include reduced attention and memory impairment. Should not be abruptly stopped as this can cause withdrawal effects

Dantrolene

Site of action - The only anti-spasticity drug that works directly on muscles

Initial and maximum doses - 25mg daily up to a maximum of 400mg

Side effects - Side effects are unfortunately quite common and include nausea, vomiting, diarrhoea and weakness. A doctor will take regular blood tests to ensure that the function of the liver is not affected

What if the oral drugs don't help?

If the oral anti-spasticity medications prove ineffective or their side effects unbearable, Sativex may be prescribed as an add-on treatment.

Sativex

Sativex is a cannabis-based mouth spray. It is licensed as an add-on treatment to MS related spasticity when people have shown inadequate response to other symptomatic treatments or found their side effects intolerable.

Sativex can only be prescribed by a specialist doctor with experience of treating MS spasticity, for example: consultant neurologists, consultant rehabilitation specialists and consultant pain specialists. A specialist doctor will conduct a full assessment of the severity of spasticity related symptoms and an evaluation of the response to standard spasticity treatments for individuals who might benefit from the use of Sativex.

For further information see the MS Trust's Sativex factsheet.

Other treatment options

If management strategies, therapy input and oral drugs are not providing adequate relief, then the following treatments may be considered:

- **Intramuscular botulinum toxin**

When botulinum toxin is injected into muscles it temporarily weakens them. It can take 14 days for the full effect of the toxin to occur and it lasts approximately three months. When combined with an intensive period of moving and stretching this can lead to a reduction in spasticity over longer periods. Advice on a specific stretching program is best provided by a physiotherapist or occupational therapist around the time of the injections.

- **Intrathecal baclofen therapy**

Intrathecal baclofen therapy is an alternative way of delivering baclofen directly to the appropriate nerve cells in the spinal cord by administering it into the intrathecal space (the space around the spinal cord within the spine). This can be helpful for those people who find they cannot tolerate oral baclofen. In the short-term intrathecal baclofen can be given via a lumbar puncture. For long-term treatment a pump is required to deliver

baclofen 24 hours a day. The system is completely implanted inside the person with the pump surgically placed in the abdomen. The pump has a reservoir that stores the baclofen and a catheter that links the reservoir to the intrathecal space.

Different types of pump are available with the baclofen pumped into the spine either electronically or via a gas-compression system. The pumps enable much smaller amounts of baclofen to be used, reducing any side effects that a person may have experienced when taking baclofen orally.

Embarking on intrathecal baclofen therapy is not a simple decision to make. Not only does it involve surgery but also regular reservoir refills and, if using the electronic model, further surgery after five to seven years when the battery depletes. Before implantation, a trial of the drug can be given via a lumbar puncture. This gives the person, their family and the treating team the opportunity to experience and assess the potential outcome of having intrathecal baclofen before committing to the surgical implant.

- **Intrathecal phenol**

This treatment tends to be reserved for severe spasticity that is not responding to other forms of treatment. Intrathecal phenol is given via a lumbar puncture and requires a specialist doctor to inject it. Intrathecal phenol is a destructive treatment that stops nerve conduction. This can significantly reduce lower limb spasticity but negative effects can occur such as a reduction of leg sensation, reduced sexual function, and altered bladder and bowel function. People suitable for intrathecal phenol will already be experiencing a change in these areas and will have effective management strategies in place, for instance a suprapubic catheter or regularly use of suppositories.

Surgery

Occasionally a neurologist may recommend orthopaedic or neurosurgical procedures, although these are becoming more rare.

4. Measuring the impact of treatment

To help understand if a particular drug or stretching regime is helping a person's spasticity and spasms, health professionals may ask to measure a person's symptoms. Measures are tools that use numbers or words to classify or quantify symptoms in order to compare the degree of spasticity, spasms and pain over time or before and after treatments.

Spasticity measures

There is no one measurement tool or scale that adequately measures spasticity. In practice, a series of measures is often required to reflect different aspects of spasticity.

These approaches will look at different aspects of the symptoms:

- Moving limbs to physically measure the distance that they can be moved
- Asking the individual to report on how they are affected by their symptom - eg the Penn Spasm Frequency Scale involves the individual reporting the type and frequency of spasms
- Assessment of symptoms by a health professional - eg the Ashworth Scale involves the measurer moving a limb through its available range and assessing the level of stiffness

Evaluating and measuring spasticity in partnership

For some people, being measured can make them feel as if they are enduring a test or being judged. The process encourages them to focus on their level of disability, which they may not normally do; this may be emotional, challenging and distressing. For others, the measuring process helps them to be more specific about changes they feel in their bodies or the impact on their lifestyle. Health professionals are advised to be alert to how a person may be feeling and provide support through education, engagement and involvement to enhance the measuring process³. Education involves explaining why measurement is required, how it will help the assessment and the role of the person with MS. Being involved in the process allows the person to share how they are experiencing the changes in their spasticity and spasms and how this may affect their function at home. It's important to remember being measured is not a test and there is no right or wrong. It is just a baseline for comparison.

In summary, effective spasticity management requires ongoing management of posture through movement and stretches, the management of trigger factors and the careful evaluation and use of drug treatments.

5. References

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Please contact the MS Trust Information Team if you would like any further information about reference sources used in the production of this publication.

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