

# Rehabilitation in spasticity

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The severity of spasticity (mild, moderate and severe), its interference with body structure and functional activities, and the distribution of affected muscles (leg, back, arms) varies in every person with MS. Rehabilitation interventions should provide tailored information and treatment options based on goal-setting with the person with MS, with the aim of promoting self-management.

## **Mild spasticity and rehabilitation**

In the early stage of MS, people with MS do not often report signs of spasticity although a therapist may detect them. At this early stage, a general level of fitness is advised while optimally preserving muscle flexibility.

### ***Self-stretching and strengthening exercises***

A physiotherapist will give guidelines on how to stretch the muscles which are prone to spasticity, such as quadriceps, hamstrings and calf muscles. Self-stretching should be performed twice a week, with 3-5 repetitions of 30 seconds' stretching for each muscle, with emphasis on breathing out during the stretch. Stretching can also be achieved during more global positions such as a lotus sitting position. Additionally, weak muscles

such as hamstrings and foot dorsiflexors can be strengthened during functional activities, for example by using elastic bands and/or weights or fitness equipment.

Information about spasticity and other MS symptoms can help a person with MS judge whether movement abnormalities are MS-related or not. For example, experiencing a stiff knee after hours of physical labour in the garden compared to spontaneously experiencing stiffness in a knee.

## **Appropriate management of moderate spasticity**

After a number of years, spasticity may manifest as increased muscle tone and muscle stiffness which may interfere with activities such as walking. An individual may show an inwardly rotated foot position, a stiff knee or excessive trunk extension during walking.

### ***The positive and negative effects of spasticity***

To decide whether interventions are needed at this stage, one must determine whether spasticity has occurred as a compensation for decreased muscle force or whether it is impeding muscles (such as knee flexors or foot lifters) from contracting easily. For example, a stiff knee may be needed to be able to walk when the quadriceps muscle is too weak for weight-bearing. In this case, reducing spasticity may lead to decreased walking capacity and perhaps to increased wheelchair dependency. Similarly, some may need the increased muscle tone of leg extensor muscles and trunk to enable independent transfers from wheelchair to bed.



Italian MS Society

*A physiotherapist works with a person with MS to stretch affected muscles.*

**Treatment approach for moderate spasticity**

As well as self-stretching or stretching with assistance, spasticity can be reduced by tone-inhibiting movements (such as weight transfer between legs, active forward lean, active unloaded, passive cycling or horseback riding) and postures. When maintaining tone-inhibiting postures, muscles should be stretched for a period of time (30 seconds). Tone-inhibiting postures may be used to stretch calf and hamstring muscles, or by lying in a prone position, for a prolonged stretch of the hip flexor muscles. Weights can be used to reinforce the effect.

Weak muscles have to be strengthened when possible. During walking, a simple orthosis, which is a device that can be used to prevent or assist movement or a more advanced technique, such as functional electrical stimulation, can help facilitate a proper gait.

**Severe spasticity**

In a later stage, people with MS may need the aid of a wheelchair due to pronounced muscle



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*A physiotherapist can advise on different stretches to relieve spasticity.*

## **Rehabilitation interventions should provide tailored information and treatment options based on goal-setting with the person with MS.**

weakness and stiffness and the increased risk of muscle contractures. Painful spasms may also sometimes manifest in the lower limbs.

**Aggravating factors and treatment approaches**

Spasticity and spasms can occur spontaneously or be aggravated because of sensory contact, manual manipulation, pain, urinary tract infections, decubitus ulcer or pressure sores.

It is important to identify the aggravating triggers of these symptoms and to ensure clear communication about them between the person with MS and the multidisciplinary team. For example, a urinary tract infection must be detected and treated in order to avoid the worsening of spasticity, or a family member or caregiver should be instructed how to handle the leg or other parts of the body sensitive to manual contact.

At this stage, physiotherapy may also include mobilisation to prevent muscle contractures and stiff joints and to help facilitate comfortable sitting and lying positions, as well as to facilitate a person's personal care (for example, dressing and bathing). The mobilisation of legs, arms and the trunk is passive or may be incorporated into active movements. Also taken into account is the mobilisation of connective tissue such as peripheral nerves, for example, with neurogliding techniques, which mobilise rather than stretch neural tissues. Passive mobilisation must be executed slowly and should be carefully sustained when approaching the natural limit of the muscle or joint, especially when sensory loss is a factor.

Cooling therapy has been suggested as a means for improving spasticity, although rigorous scientific studies with large groups of subjects



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*A stretching or exercise class may help provide social support.*

are lacking. There is variability as to the most efficacious cooling techniques, which range from ice and cold water baths to cold packs and cooling garments that use circulating coolants and run on a battery.

When sitting for long periods in a wheelchair, there is a greater risk of tone increase and muscle shortening (for example of hip adductors and hip flexors). Rehabilitation should then include instruction on sitting correctly in a tone-inhibiting posture (for example, with knees separated). Tone-inhibiting postures enable long-term stretching of the spastic muscles and are effective in preventing muscle shortening. Another option is to use a tilting table to stretch hip flexors and calf muscles using body weight. For the arms, one can consider individually adapted splints, for example to maintain an

open hand position, which is important for hand hygiene.

Muscle contractures (for example, hamstrings or hand flexors) may be present at this stage. When these hamper functional activities, serial casting (a temporary cast) can be used to recover a full range of motion.

**Conclusions**

Rehabilitation can offer guidance and therapy to reduce spasticity and prevent muscle contractures and joint stiffness. However, a multi-dimensional evaluation must be performed to investigate the interplay between spasticity and functional mobility before selecting the best rehabilitation approach. Rehabilitation interventions can then be used alongside pharmacological and neurosurgical treatments.