

## Mellen Center Approaches: Spasticity

### What is spasticity?

Spasticity is a movement disorder, defined as a velocity dependent increase in stretch reflexes. Spasticity rarely, if ever, comes alone. It is usually associated with other upper motor neuron impairments such as weakness or loss of dexterity. In MS, it is also associated with other neurologic impairments. Spasticity causes positive (spasms, clonus, co-contraction of agonist and antagonist muscles, synergy patterns) and negative (resistance to passive movement, decreased range of motion) phenomena. When assessing spasticity, it is important to assess tone at rest and while performing an activity (particularly standing and walking).

Leg spasms at night are sometimes difficult to distinguish from restless leg syndrome. Since these disorders have distinct clinical features and treatment, it can be helpful to order a sleep study if the patient complains of involuntary leg movements at night without other symptoms and signs of spasticity, or if treatment for spasticity does not improve the leg movements.

#### REFERENCE:

Lance J. Symposium synopsis. In: Feldman RG, Young RR, Koella WP, eds, Spasticity: Disordered Motor Control, (Year Book Medical Publishers: Chicago, 1980) 485-94.

### How frequent and significant is spasticity in MS?

Spasticity is frequent in MS. It is sometimes difficult to determine its impact among other impairments (e.g. distinguishing between pain from spasticity and neuropathic pain, or understanding how much spasticity alone impairs function versus weakness, cerebellar ataxia, sensory loss, imbalance, visual loss, or cognitive problems).

The consequences of spasticity include: sleep disruption, discomfort, interference with work or other activities of daily life, gait/balance disturbance,

abnormal limb posture and contractures, interference with caregiving, interference with bladder and bowel function.

#### REFERENCE:

Rizzo M, Hadjimichael O, Preiningerova J, Vollmer T, Prevalence and treatment of spasticity reported by multiple sclerosis patients, Multiple Sclerosis 2004; 10:589-95.

### How is spasticity assessed?

Spasticity is assessed clinically. Interview (stiffness, tightness, cramping, spasms, difficulty moving), examination (resistance to passive movement, observed spasms and clonus, observed functional limitations). Physical and/or occupational therapy evaluations are a very helpful complement, especially when functional improvement is sought. We frequently use the Modified Ashworth Scale and Spasm Frequency Scale as outcome measures.

The impact of current or past treatments for spasticity should also be documented: efficacy, side effects such as weakness or sedation.

#### REFERENCE:

Pandyan AD et al. A review of the properties and limitations of the Ashworth and modified Ashworth scales as measures of spasticity. Clinical Rehabilitation 1999;3: 373-83.

### When should spasticity be treated?

Spasticity can be treated at any stage of MS. The rate of progression of spasticity may be more rapid than the rate of disease progression, due to a cycle of hypertonia leading to decreased movement, leading to deconditioning and increased hypertonia. Early detection and treatment are preferred. Reasonable goals for spasticity management are established between patient and health care professional: comfort, ease of care (passive function), posture, active function, to decrease the risk of medical complications (e.g. contractures, decubitus ulcers).

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Other explanations for onset or increase in spasticity should be ruled out, particularly if these conditions can be treated or corrected (for example cervical spondylosis with myelopathy, urinary retention and UTI, decubitus ulcers, severe constipation, pain, medications such as interferon beta or statins).

Spasticity need not always be treated aggressively. For example, some patients “walk on their spasticity”. This is particularly true of patients who are “marginal ambulators” (EDSS 7.0 to 7.5).

### REFERENCE:

Multiple Sclerosis Council for Clinical Practice Guidelines, Spasticity management in multiple sclerosis. Consortium of Multiple Sclerosis Centers. 2003.

### What is the role of rehabilitation in spasticity management?

We refer patients with spasticity to physical and/or occupational therapy early. A therapist with neurorehabilitation experience is preferred. Rehabilitation and home exercise are used as a complement to other treatments. Rehabilitation interventions include: to start a stretching and exercise program, to provide appropriate orthoses and assistive devices, to perform lower and upper extremity functional training, and to conduct periodic re-assessments.

### REFERENCE:

Bethoux F : Management of Spasticity in Multiple Sclerosis. In Cohen JA and Rudick RA : Multiple Sclerosis Therapeutics. Third Edition; Informa UK Ltd ed., London 2007:787-98

### How are oral medications used to treat spasticity in MS?

Baclofen and tizanidine are the main oral medications for spasticity. Baclofen may cause weakness, sedation, and dizziness. Tizanidine may cause the same side effects, and carries a risk of hypotension and liver toxicity. Dantrolene is seldom prescribed in MS due to a significant risk of weakness and liver toxicity. Benzodiazepines, gabapentin, levetiracetam, clonidine, can be used off label. The “start low, increase slow” rule should be applied when trying these medications. We usually start with a monotherapy, then try combination therapy if needed, always being mindful of the risk of potentiation of side effects. The dosing schedule varies from bedtime only

to 4 times daily. For example, baclofen and tizanidine can be alternated throughout the day. Patients should be warned to avoid stopping lioresal suddenly to avert the risk of withdrawal (itching, fever, severe spasms, paresthesias, seizures, encephalopathy).

### REFERENCE:

Shakespeare DT. Boggild M. Young C. Anti-spasticity agents for multiple sclerosis. Cochrane Database of Systematic Reviews 2003; 4:CD001332.

### When is botulinum toxin (BT) used to treat spasticity in MS?

BT is useful to address focal problems related to spasticity, even if spasticity is otherwise diffuse. In our experience, BT is effective in controlling focal cramps/spasms, improving range of motion, making it easier to fit orthoses. Functional improvement may occur with rehabilitation.

### When is intrathecal baclofen (ITB) used to treat spasticity in MS?

ITB therapy is considered when there is severe diffuse spasticity in the lower extremities, and other treatment modalities have failed (not effective or not tolerated). Because of the risks involved and need to ensure compliance with management, a detailed preliminary assessment, followed by a test injection of ITB, are performed before referring the patient to surgery. Our experience has shown that ITB can be used in ambulatory MS patients without compromising function, and with some qualitative improvement of gait performance.

### Summary:

- When spasticity is mild to moderate, first line interventions (stretching, exercise, oral medications) can be implemented through routine management. A referral to physical or occupational therapy is indicated when functional improvement is sought.
- When spasticity is moderate to severe and first line interventions are not effective or not tolerated, multimodal management and more invasive interventions should be considered. Referral to a spasticity clinic should be considered at this stage.

**AUTHORS:** F. Bethoux, D. Stough and the Mellen Center Professional Staff

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## Appendix:

### Modified Ashworth Scale

- 0 - No increase in tone
- 1 - Slight increase in tone (catch and release at end of ROM)
- 1+ - Slight increase in tone, manifested by a catch, followed by minimal resistance throughout remainder (less than half of ROM)
- 2 - Marked increase in tone through most of the ROM, but affected part(s) easily moved
- 3 - Considerable increase in tone; passive movement difficult
- 4 - Affected part(s) rigid in flexion or extension

### Spasm Frequency Scale

- 0 - No spasm
- 1 - Spasms when stimulated
- 2 - Occasional spontaneous spasms
- 3 - >1 but <10 spontaneous spasms/hr
- 4 - >10 spontaneous spasms/hr

### Useful resources:

- The MS International Federation recently published an issue of MS In Focus on spasticity, which can be downloaded free at <http://www.msif.org/en/>
- The Clinical Practice Guidelines on Spasticity Management in MS can be downloaded free at <http://www.pva.org/site/News2?page=NewsArticle&id=8175>
- Patient education brochures on spasticity, stretching, and exercise can be downloaded from the National MS Society website at <http://www.nationalmssociety.org/multimedia-library/brochures/index.aspx>