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Enhancing Patient Communication for the MS Nurse

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Practical Approaches to Spasticity Management

A Roundtable Discussion

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Counseling Points™

Practical Approaches to Spasticity Management

Continuing Education Information

Target Audience

This educational activity is designed to meet the needs of nurses who treat patients with multiple sclerosis.

Purpose

To meet MS nurses' educational needs on current topics in multiple sclerosis, acknowledging the nurse's role in patient counseling.

Learning Objectives

Upon completion of this educational activity, the participant should be able to:

- Identify signs, symptoms, and triggers of spasticity in multiple sclerosis (MS)
- Discuss treatment goals for patients with spasticity, including prevention of complications
- Summarize benefits of physical therapy for patients with MS
- Analyze the pros and cons of various medical therapies for spasticity in MS

Continuing Education Credit

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This activity has been approved for 1.0 contact hours.

Approximate time to complete this activity is 1 hour.

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welcome

Dear Colleague,

Spasticity can be a devastating aspect of multiple sclerosis (MS). When not managed properly, it can rob patients of their mobility as well as their dignity. For some patients with MS, involuntary movements and muscle contractures represent a distressing physical reminder of the loss of control over their bodies. For many, spasticity is also a significant source of pain. Spasticity symptoms can be opportunistic, striking or worsening when the patient with MS is experiencing another complication, such as a bladder infection or even something seemingly minor such as an ingrown toenail.

Proper management of spasticity can go a long way toward giving patients with MS relief and increased control over their condition. Management usually involves a combination of pharmacologic and nonpharmacologic approaches. Many patients are surprised by how much relief they get from a well-designed stretching routine. A number of effective drug therapies are available, the mainstay being baclofen delivered either orally or via injection or intrathecal pump. The consideration of whether to try an implantable pump is a critical one for patients with MS with spasticity and, in my opinion, one that is often delayed too long. At the same time, a balance must be achieved to avoid overtreating spasticity, as some limb rigidity is necessary for mobility and proper muscle function.

For this issue of *MS Counseling Points*™, we have assembled some of the top experts on managing spasticity among MS health care professionals. Nurses can receive continuing education credit for completing this program, so please refer to the instructions on page 14 for more details.

Amy Perrin Ross

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Practical Approaches to Spasticity Management

Working with the patient with multiple sclerosis (MS) to monitor and manage spasticity is a key role of the MS nurse. Spasticity is one of the most common symptoms in MS, affecting as many as 85% to 90% of patients.[1] It is by no means limited to those with more advanced disease.[1] Symptoms of spasticity can strike anyone with MS and are often triggered or made worse during an exacerbation or infection, by fatigue, or even by too-tight clothing. Educating the patient about spasticity is an essential part of better management, including postural correction and stretching, appropriate medication use, awareness of spasticity triggers, and psychological adjustment. It is important to stress to patients that spasticity is a highly manageable symptom and does not necessarily need to lead to disability.

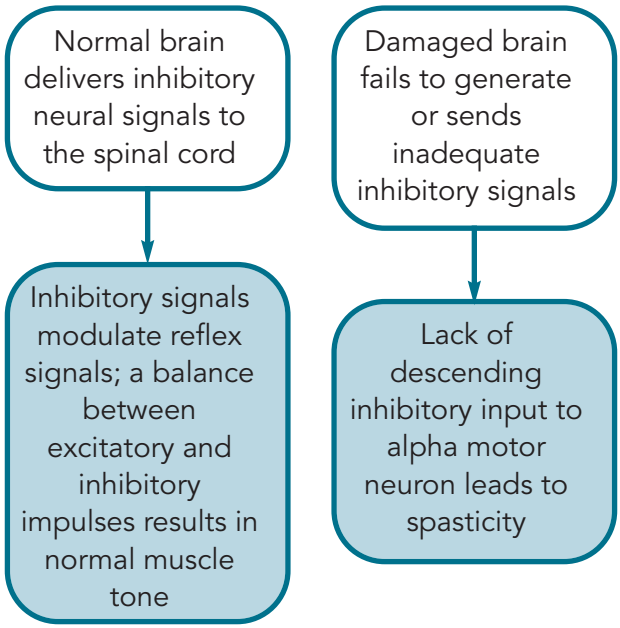
What is Spasticity?

The term spasticity comes from the Greek word *spastikos,* which means to draw or tug.[2] In MS, spasticity describes the phenomena of involuntary muscle stiffness, muscle contractions (spasms), or involuntary movements.[3] The classic definition of spasticity is "a velocity-dependent increase in muscle tone and resistance to passive stretch often with more resistance to rapid movement."[4] As noted, spasticity often occurs with effort during activity. When a voluntary movement activates the muscles around a joint, involuntary contractions will prevent the joint from moving through its full range of motion.[3]

While any muscle can be affected, spasticity in MS usually affects the limbs and trunk. Patients may experience initial symptoms as a sensation of heaviness in the extremity or an inability to move a joint.[3] Patients with MS may say their muscles feel stiff, heavy, and difficult to move.[5]

Physiologically, spasticity is believed to be caused by an imbalance between excitatory and inhibitory impulses to the neurons.[6] The upper motor neurons are those descending from the motor cortex of the brain to the spinal cord, while lower motor neurons lead from the spinal cord to the muscle fibers. Muscle tone is regulated by output from alpha motor neurons (large lower motor neurons) in the spinal cord. When a proper balance exists between excitatory impulses (from the muscle stretch receptors) and inhibitory impulses (from the brain), muscle tone is normal. However, nervous system damage due to MS or other conditions such as spinal cord injury often interferes with the generation of adequate inhibitory signals. Thus the excitatory signals from the muscles do not have a sufficient counterbalance in the brain, leading to excessive muscle tone and involuntary movements **(Figure 1)**.

Figure 1. Pathophysiology of spasticity.[6]



Types of Spasticity in MS

How patients experience spasticity tends to vary widely among individuals. Types of spasticity are outlined in **Table 1**, with examples of how they affect the body.[7,8] Extensor patterns, involving the quadriceps and adductors, are commonly seen in MS and are often expressed as an involuntary straightening of the legs. Flexor spasticity generally affects the hip flexors, and causes the hips and

Table 1. Types of Spasticity in MS[8]

Flexor
Limb bends upwards toward the person's body

Extensor
Limb extends away from the person's body

Adductor
Limb pulls inward towards the person's body. A patient might experience this as difficultly separating the thighs

Trunk
The back or trunk may arch off a bed or away from the back of a chair

knees to bend up toward the chest. Spasticity may involve the limbs unilaterally or bilaterally. In the patient with MS, the legs are more often affected than the arms.[8]

The degree of severity in spasticity can also vary widely, from mild, episodic spasms or stiffness to a significant problem causing constant pain and limited mobility. It is important for both clinicians and patients to understand that spasticity is not limited to patients in advanced stages of MS. Clinical signs of spasticity **(Table 2)** may be observed very early in MS and often detract from the ambulatory patient's ability to move about safely.[9]

How spasticity is expressed usually varies with positioning. A patient may notice more flexor spasms when hips and knees are flexed. Some patients may have difficulty clearing a foot while walking, whereas these muscles are not affected when they are lying down or seated. In many patients, spasticity increases at night, making sleep more difficult. Muscle weakness in MS may couple with spasticity to affect the patient's posture and movements.

Untreated, spasticity can result in serious consequences, including muscle fibrosis and joint contracture that can lead to skin breakdown, osteomyelitis, and sepsis.[3] Uncontrolled spasticity leads to pain, reduced mobility, and reduced quality of life, which in turn leads to social isolation and depression.[3] Functional impairments associated with spasticity in MS are outlined in **Table 3**.[3]

Table 2. Clinical Signs of Spasticity[9]

- Hyperactive reflexes
- Muscle spasms
- Clonus (spasms characterized by alternating contractions and relaxations)
- Pain (e.g., "charley horse"-like cramps)
- Impaired voluntary control of skeletal muscles

Common Spasticity Triggers

One of the most common precipitating factors for increased spasticity is a urinary tract infection (UTI).[10] In fact, some nurses will recommend that patients be tested for UTI prior to a spasticity evaluation, to rule it out as a possible cause. Since most patients with MS already have some degree of bladder dysfunction, symptoms of UTI such as pain or frequent urination may otherwise be overlooked. Other types of infection are also known to trigger spasticity, from serious infections such as pneumonia to a seemingly simple complication such as an ingrown toenail. By the same token, fever is a common trigger for spasticity.

Some spasticity triggers such as menstruation or bladder dysfunction are not possible for the patient to control, while others can be quite simple to manage **(Table 4)**. For example, clothing that is too restrictive is a common problem, especially in younger patients, who may not realize that their favorite pair of tight jeans is also leading to increased symptoms.

Table 3. Functional Impairments Associated with Spasticity in MS[3]

- Pain
- Fatigue
- Poor quality/reduced sleep
- Soft tissue shortening
- Joint contracture
- Deconditioning
- Bladder/bowel dysfunction
- Pressure sores
- Poor body image/self-esteem
- Difficulty swallowing
- Impaired sexual function
- Poor skin hygiene/skin breakdown

Table 4. Spasticity Triggers in MS

Uncontrollable
- Urinary tract infection
- Kidney stones
- Menstruation
- Bowel impaction or gas
- Deep vein thrombosis
- Pneumonia
- Wounds or infections
- Progression of disease

Controllable
- Stress
- Ingrown toenail
- Restrictive clothing
- Fatigue
- Psychological factors
- Change in temperature or humidity

Other "controllable" factors such as stress and fatigue present more of a challenge for the patient with MS and may require support in the form of relaxation and adaptive techniques to help reduce their impact on spasticity and other quality-of-life aspects. These factors are often inter-related; fatigue can trigger spasticity but the reverse is also true, in that prolonged spasticity and the efforts made to compensate for it can increase fatigue.[11]

Evaluating Spasticity

Evaluation of the patient with MS for spasticity begins with a thorough history to determine how and when the patient is experiencing spasticity. The evaluation should determine:

- onset and evolution of spasticity;
- severity of spasticity (mild, moderate, severe);
- presentation of spasticity (focal, segmental, or global presentation);
- triggers or movement patterns that set off spasms or spasticity;
- co-morbidities that may contribute to or affect spasticity presentation;
- current and previous spasticity interventions, including effectiveness of treatment, duration of effect, presence of side effects;
- patient's chief complaint(s);
- how the symptoms limit the patient's activities and quality of life; and
- patient goals for spasticity treatment or intervention.

The patient may be asked to mimic a particular motion or activity that tends to trigger involuntary movement or spasms. Most patients complain of symptoms occurring at night and interfering with sleep. It is useful to ask patients to keep a diary, recording when they notice spasticity. Some clinicians use the diaries in combination with the Penn Spasm Frequency Scale **(Table 5)**.[12]

The Ashworth Scale **(Table 6)** is a standard tool used in research and clinical practice to quantify and measure changes in the degree of spasticity.[13] To use the Ashworth Scale, the nurse or physical therapist evaluates passive range of motion of each joint as rapidly as possible, noting the amount of resistance to that motion. This assessment is a passive test for which the patient must be completely relaxed.

Table 5. Penn Spasm Frequency Scale[12]

Score	Criteria
0	No spasms
1	No spontaneous spasms, but spasms induced with vigorous motor stimulation
2	Infrequent spasms occurring less than once per hour
3	Spasms occurring more than once per hour, but <10
4	More than 10 spontaneous spasms per hour

Table 6. Ashworth Scale[13]

Score	Criteria
1	No increase in tone
2	Slight increase in tone
3	Marked increase in tone, but affected part(s) easily flexed
4	Considerable increase in tone; passive movement difficult
5	Affected part(s) rigid in flexion or extension

Many clinicians and researchers use the Modified Ashworth Scale **(Table 7)** because it allows for a more sensitive measure of mild spasticity by providing an additional scoring level (1+) in the milder range.[14] The modified scale also offers more detail on *where* in the range of motion the resistance occurs and *how much* resistance is felt (how easily the movement is executed). Neither scale is ideal, in that they do not differentiate well between the neural and non-neural components of spasticity.[14]

Behavior of the muscles is often different at rest and following exercise. Spasticity tends to be increased with exercise, so if the patient leaves the examining room and is asked to walk up and down the hall, the effects of spasticity may be observed more clearly. When observing the effect of spasticity on gait patterns as the patient walks, it is important for the nurse to evaluate how the limitations affect the patient's risk of falls and other possible sources of injury.

Why Spasticity Is Not Always Bad

For patients who have markedly reduced muscle strength, some of the rigidity caused by spasticity may assist the person in standing, ambulation, and other movement that might not otherwise be possible.[15] The patient needs a

Table 7. Modified Ashworth Scale[14]

Score	Criteria
1	No increase in tone
1+	Slight increase in tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of range of motion
2	Slight increase in tone
3	Marked increase in tone through most of range of motion, but affected part(s) easily moved
4	Considerable increase in tone; passive movement difficult
5	Affected part(s) rigid in flexion or extension

full spasticity screening to determine the specific circumstances in which spasticity is an advantage or a detriment. Some of the advantages of spasticity include:

- maintains muscle tone/bulk;
- helps support circulatory function;
- may prevent formation of deep vein blood thrombosis;
- may assist in activities of daily living; and
- may assist with postural control.

Because we all need a certain amount of stiffness in our muscles, treating spasticity requires a careful balance. If spasticity is overtreated, the underlying muscle weakness may prevent the patient from having adequate tone for standing and walking. When considering therapeutic interventions, it is useful to ask: Is the spasticity preventing function? Is it interfering with safety? Causing pain? Resulting in contractures? Is spasticity interfering with hygiene or sexual function? Goals of therapy are outlined in **Table 8**.

Goals of therapy need to be patient-specific, in terms of increasing function and improving quality of life. It is important to reiterate to the patient that the goal of therapy does not involve eliminating all spasticity.[3,15]

Nonpharmacologic Treatment Approaches

To maximize treatment success, spasticity management should be an interdisciplinary, team process.[3] Nonpharmacologic approaches include stretching, physical therapy, and hydrotherapy. In particular, daily stretching exercises before bed and first thing in the morning have been shown to markedly reduce spasticity for many patients, with or without drug therapies.[16] Treatment should be individualized for the patient with considerations made to balancing efficacy with side effects, cost, and the patient's ability to execute the treatment and follow up with healthcare providers.

Skilled rehabilitation strategies are a mainstay of any treatment program for spasticity, according to the most recent Consortium of Multiple Sclerosis Centers (CMSC)-recommended guideline by Haselkorn et al.[3,17,18]

A study by Solari et a demonstrated the superiority of skilled physical therapy over an independent home program in relieving spasticity in MS.[18] The investigators compared the effectiveness of twice-daily skilled therapy for 3 weeks in an inpatient setting (n=27) with that of a 1-day training course with written instructions for home exercise (n=23). Almost half (48%) of the inpatient group demonstrated improvement on motor domains of the Functional Independence Measure, versus 9% of the control group. After 9 weeks, these improvements were still apparent in 44% of the inpatient group versus 4.5% of controls.

Part of skilled physical therapy is joint range-of-motion exercise, which should be initiated as early as possible for those joints at risk for restricted movement.[3] As noted, muscle stretching is another key element of therapy to minimize risk of muscle shortening. Stretches should ideally be done twice daily. Some have suggested that a stretch must be sustained for longer than a minute, or prolonged with a splint or brace, to effectively impact spasticity.[19]

Muscle strengthening is also important. As inactivity leads to progressive weakening of spastic muscles, individualized, gradual strength-training programs should be initiated early to optimize the integrity of affected muscles.[20] At the same time, care must be taken to limit

Table 8. Goals of Therapy for Spasticity

- Decrease pain
- Prevent or decrease contractures
- Improve ambulation
- Increase safety
- Facilitate activities of daily living
- Facilitate participation in rehabilitation
- Save caregiver time and improve ease of care

fatigue, which may quickly overcome the patient with MS upon exertion.

Massage, described in one study as "light-pressure stroking," has shown positive results in the management of spasticity as an adjuvant to stretching and joint range-of-motion programs.[21] Light-pressure stroking may decrease alpha-motor neuron excitability and help to facilitate the inhibitory response in affected muscles.[21]

Cooling is another adjuvant therapy recommended for spasticity management.[22] Evidence-based guidelines recommend use of cool pools (80°F to 82°F) to actively stretch spastic muscles and maintain and build endurance, although some patients may prefer a slightly warmer 85°F.[3]

Local application of cool towels may provide temporary relief of localized muscle spasms and spasticity, while cooling garments may offer more prolonged relief.[3] One study evaluated the use of cooling garments (vest and cap) worn 40 minutes twice weekly for 2 weeks.[23] This method reduced core body temperatures, and reduced spasticity in five of six ambulatory patients and six of six of those using a wheelchair. Improvements were seen in strength and gait skills, and the effects of cooling lasted from 12 to 24 hours following treatment. Local cooling must be used with caution to prevent tissue damage. Therapy involving heat is not recommended in patients with MS.[3]

Many patients with MS benefit from orthotic devices, which provide support to joints and help maintain proper postural alignment and safe mobility. Patients should be referred to a qualified therapist to customize orthotic devices for long-term use.

Transcutaneous electrical nerve stimulation (TENS) has been shown to provide relief for some patients with MS with painful spasms. In a small study of TENS, electrodes placed directly over painful muscles at night reduced sleep disturbance and "completely controlled" pain in four of eight patients and "significantly reduced" pain in two.[24]

Pharmacologic Management

Effective medications, combined with nonpharmacologic methods, can go a long way toward relieving spasticity symptoms for most patients. In addition, use of disease-modifying therapies for MS (e.g., beta-interferon, glatiramer acetate, and other therapies) helps to slow the progression of neuronal injury, which has an indirect benefit on spasticity and other MS symptoms.

Several categories of medications have been used for the management of spasticity **(Table 9)**. Because patients' symptoms respond differently to medications, therapy must be tailored to the individual patient.

Muscle Relaxants

Muscle relaxants, which include baclofen and tizanidine, are the mainstay of treatment for spasticity. CMSC-endorsed guidelines recommend starting with either baclofen or tizanidine and adding other agents (or a combination of these two drugs) in a stepwise approach.[3] Studies of baclofen have demonstrated improvements in spasticity, clonus, ability to manage without assistance, and facilitation of active or passive physiotherapy in approximately 70% of treated patients.[25-27]

Baclofen can be given orally, by injection, or intrathecally (intrathecal therapy is discussed on page 10). The most common side effects are drowsiness, nausea, vertigo, and dry mouth. Because sedative side effects are a major drawback of muscle relaxants, proper dosage and slow titration are key. Studies have examined doses as low as 30 mg and as high as 225 mg/day, although side effects increase dramatically with doses above 100 mg/day. In the initial trials of baclofen, side effects were enough to nulli-

Table 9. Categories of Medications Used for Treating Spasticity

Category	Commonly Used Agents	Comments
Muscle relaxants (oral)	Baclofen, tizanidine	Sedating when given orally; often used together
Anxiolytics	Clonazepam, diazepam	Low doses; less effective as monotherapy; may be combined with other agents
Antiseizure drugs	Gabapentin, pregabalin	Gabapentin may be preferred due to high cost of pregabalin
Paralytic	Dantrolene sodium	Use limited to refractory cases due to potential for liver toxicity
Nerve blocks	Botulinum toxin	Useful for localized spasms or bladder spasticity

fy the therapeutic value of the medication or require withdrawal in approximately 5% of patients.[25-27]

Tizanidine may be used either in combination with baclofen or on its own. This drug may be more expensive than baclofen, especially the controlled-release capsule. The most common side effects are dizziness, drowsiness, dry mouth, and fatigue.[28-31] Tizanidine doses used in clinical studies ranged from 2 mg/day to 36 mg/day. Because this medication can be especially sedating, some clinicians opt to prescribe it at night for relief of nocturnal spasticity while prescribing baclofen during the daytime. There is evidence that the drowsiness associated with tizanidine may diminish over time, so patients who stay on the therapy may be able to get "over the hump."

Head-to-head studies of baclofen and tizanidine have not shown "compelling differences" in the efficacy of these agents.

Head-to-head studies of baclofen and tizanidine have not shown "compelling differences" in the efficacy of these agents.[32,33] Tizanidine was associated with more sedation, while baclofen was associated with more weakness. Caution must be taken for patients who drive while using muscle relaxants.

Anxiolytics

Clonazepam or diazepam in low doses may be used to treat spasticity. One trial compared the efficacy and side effects of diazepam (average 15 mg/day) with that of tizanidine (average 14.3 mg/day) in 30 patients with MS-related spasticity.[34] While spasticity was improved in patients from both groups, the four who discontinued therapy were all in the diazepam group, with side effects including muscle weakness and drowsiness. In trials comparing baclofen with diazepam or clonazepam, more sedation was also seen in patients using the anxiolytics.[35-37]

Antiseizure Drugs

Among antiseizure drugs, gabapentin is the most commonly used agent for treating spasticity, although clinical trial data are limited.[38,39] Pregabalin is another agent that has shown efficacy, but the cost of this drug tends to limit its use to patients whose symptoms have not responded to other drugs.

Paralytics

Dantrolene has been studied in spasticity but its use has been limited in clinical practice because of concerns about the need to monitor for liver toxicity.[40] A trial may be warranted for patients who fail to respond to other agents.

Nerve Blocks

Botulinum toxin has been used with some success in MS, primarily for patients with spasticity affecting a single, targeted area. This treatment has been shown to help patients ambulate with minimal side effects, with the blockade lasting about 3 months. In a small study using Botulinum Toxin Type A in MS, Ashworth Scale and hygiene scores improved significantly after injections to the hip adductor muscles.[41] A randomized, double-blind, placebo-controlled study of 74 patients with MS also showed improvement in Ashworth scores following injection of Botulinum Toxin Type B into the thigh adductors.[42] Although costs may be a consideration, this modality may be tried when the dose of oral medication needed to control spasticity in a certain area, such as the quadriceps or adductors, would produce significant side effects.

Newer Drugs for Spasticity

Fampridine-SR, an oral sustained-release form of the potassium channel blocker 4-aminopyridine, is currently awaiting FDA approval for indications in MS and spinal cord injury (SCI). In laboratory studies, this agent has been shown to improve impulse conduction in demyelinated nerve fibers.[43] Earlier phase III trials of fampridine in MS and SCI did not show significant improvement in the spasticity endpoints.[43] A recent phase III double-blind controlled trial of fampridine by Goodman and colleagues showed significant improvement in walking ability in some patients with MS.[44] Treatment with fampridine (10 mg twice daily, n=229) was compared with placebo (n=72) over a 14-week period, with timed 25-foot walk and 12-item MS walking scales used in the efficacy analysis. The authors noted that the "improvement was associated with a reduction of patients' reported ambulatory disability, and is a clinically meaningful therapeutic benefit."[44]

Seizures are a potential side effect of fampridine treatment. In pharmacokinetic studies, neurologic improvements were related to the total fampridine dose, while

seizure induction was related to peak serum levels.[43] The SR formulation provides a longer half-life and lower peak serum levels than immediate-release formulations, reducing the risk of these adverse effects. Further studies will be needed to determine the role of this drug in treating spasticity in people with MS.

Intrathecal Therapy: To Pump or Not to Pump?

The availability of baclofen in an intrathecal pump formulation has been a major benefit to many patients with MS with spasticity. This therapy should be considered for patients with severe spasticity that is unresponsive to oral baclofen or if the patient experiences unacceptable side effects at effective doses of oral baclofen.[3]

Intrathecal baclofen (ITB) allows for continuous low-dose delivery of the medication, thus limiting side effects from oral therapy and the need for frequent injections. Having a device implanted under the skin with a catheter into the spinal area may seem like a very drastic measure to patients. Yet many MS nurses believe that patients wait too long to consider this form of therapy for relief of their spasticity. Patients who are successfully using ITB often notice a dramatic difference in their functioning, whereas those who wait may have some muscle stiffness that is difficult or impossible to be recovered.

The availability of baclofen in an intrathecal pump formulation has been a major benefit to many patients with MS with spasticity.

ITB therapy was approved in the United States for spinal origin spasticity in 1992 and for cerebral origin spasticity in 1996. Intrathecal therapy allows for effective cerebrospinal fluid concentrations of baclofen with plasma concentrations of the drug 100 times less than those occurring with oral administration.[45]

Patient education, evaluation, and preparation are essential steps in initiating ITB. To help patients decide whether ITB is right for them, it may be helpful to introduce them to others who are currently using it. While videos and other educational materials can also be helpful, patient-to-patient communication is one of the best ways to convey this information.

ITB minimizes the major side effects of oral baclofen (lethargy, sedation, confusion, ataxia) while maximizing the benefits of reduced spasticity. Anecdotally, patients report that having spasticity relieved with much lower doses of baclofen allows them to think more clearly and to feel more alert and in control. A key advantage of ITB therapy is the ability for the dosage to be titrated (noninvasively through the pump programmer) in response to fluctuations in spasticity due to illness or exacerbations of MS.[46]

On the downside is the need for careful maintenance of the pump and regular refills. Pump failures that occurred with early pump models are fortunately rare now.[12] Pump batteries last about 5 years, but the pump must be replaced when the battery fails. Various alarms on the unit are designed to provide information about problems and should be reviewed with the patient. Potential side effects of ITB may include hypotonia, somnolence, nausea/vomiting, headache, and dizziness. Overdose could lead to respiratory depression, loss of consciousness, or reversible coma, and in extreme cases may be life-threatening. Refills must be maintained because abrupt withdrawal could lead to high fever, altered mental status, exaggerated rebound spasticity, and muscle rigidity, or more serious effects such as rhabdomyolysis. Catheter and procedural complications may occur. There may be cosmetic issues with the pump, especially on a very small patient. Patients need to have a realistic expectation about what the pump will do for them, in light of their treatment goals and overall quality of life.[12]

Patient Evaluation

Patient education is a critical part of preparation for ITB therapy. Patients and their families need to understand the potential benefits and risks of ITB therapy, the refill procedure and frequency, and the signs of overdose/withdrawal symptoms, and have a plan of action in place if emergency care is required. The role of family members and caregivers should be discussed ahead of time. Prior to screening, patients should slowly be withdrawn from oral antispasmodic agents.

Pre-surgical Screening

Presurgical screening is a 1-day procedure in which a test dose of baclofen is injected into the subarachnoid space while the patient is monitored over 6 to 8 hours for a

Table 10. Summary of Evidence-Based Guidelines for Spasticity in MS[3]

- Rehabilitation is an essential component of spasticity management. No single method has been found to be superior to others in efficacy
- Methods include:
  - Range of motion
  - Stretching
  - Strengthening
  - Light pressure stroking
  - Cold (not as independent modality)
- Heat is not recommended to treat spasticity in MS
- Gait training in conjunction with prescription orthotics aids and enhances mobility and safe use of assistive technology
- For oral pharmacotherapy, start with either baclofen or tizanidine
- A step-therapy approach should precede the use of combination therapy
- Intrathecal therapy is recommended for patients whose spasticity is not adequately responsive to oral and rehabilitation strategies

Adapted from: Haselkorn JK, Balsdon RC, Fry WD, et al. Overview of spasticity management in multiple sclerosis: evidence-based management strategies for spasticity treatment in multiple sclerosis. *J Spinal Cord Med.* 2005;28:173-197.[3]

reduction of spasticity. During the screening, the nurse monitors vital signs, response to the lumbar puncture, side effects and signs of overdose, and changes in spasticity. If the ITB trial is positive, it is time to discuss next steps with the patient and caregiver and whether he/she is ready to schedule surgery.

Surgery

During surgery, the pump (a round metal disc, about 1" thick and 3" in diameter) is surgically placed under the skin of the abdomen near the waistline. The catheter, also implanted, allows for flow of the medication from the pump directly into the intrathecal space. The device also consists of an external programmer. The surgery is often done on an outpatient basis. While recovery is normally straightforward, careful dosage titration after the surgery is necessary. To minimize side effects, the baclofen dose should not be raised more than 10% every 24 to 48 hours, so frequent return visits for dosage adjustment are required.[45] Patients should be warned in advance that this is a necessary but long and often-tedious process that may extend over several months.

The CMSC has adopted an evidence-based review of clinical data on spasticity by Haselkorn and colleagues as a clinical practice guideline. A brief summary of the panel's evidence-based recommendations appears in **Table 10**.[3]

The Nurse–Patient Relationship in Spasticity Management

Even if the ideal spasticity management program could be designed, it only works if the patient is able to successfully implement it. Individual habits and preferences, such as the patient's ability or desire to stretch regularly, can make or break a program. At the same time, factors related to MS such as cognitive changes (difficulties with attention, concentration, comprehension, and recall), limited mobility, fatigue, or depression can make it very difficult for even a highly motivated patient to commit to a treatment program. The sedating effects of spasticity medications may compound these problems further.

The MS nurse can help patients with self-care by developing a therapeutic partnership, fostering treatment in a team–patient relationship, educating patients and caregivers, helping to enhance the patient's support network, and setting realistic goals.[47,48]

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Counseling Points™

Practical Approaches to Spasticity Management

- Spasticity is a common problem in MS, affecting as many as 85% to 90% of patients.
- Spasticity is believed to be caused by an imbalance between the excitatory and inhibitory signals between the muscles and the motor neurons in the brain and spinal cord.
- Spasticity in MS often presents in the leg extensors, adductors, or hip flexors, and may range in severity from mild muscle stiffness to severe pain, uncontrollable spasms, and contractures. Spasticity can occur at any stage of MS.
- Triggers for spasticity may include infections, especially urinary tract infections, exacerbations of the disease, or even too-tight clothing.
- The Ashworth Scale and Modified Ashworth Scale are tools for evaluation of range of motion. Patients may be asked to keep a spasticity diary to track symptoms.
- Patients should be educated that the goal of therapy is not to completely eliminate spasticity. Some degree can be beneficial to help support weakening muscles.
- Physical therapy is a key aspect of treating spasticity, especially stretching, appropriate strength training, and range-of-motion exercises. Cool-water therapy and orthotic devices are among useful adjuvant approaches. Some patients who are helped by physical therapy may not require pharmacotherapy for spasticity.
- Pharmacotherapy should start with baclofen or tizanidine. The dosage should be titrated upward carefully and slowly while monitoring for side effects, particularly sedation.
- Other agents such as diazepam or gabapentin may be tried if the symptoms do not respond or if side effects are intolerable.
- Intrathecal baclofen is an alternative if spasticity remains refractive or if the effective oral baclofen dose is too high to be tolerated. The implantable pump allows for variable dosage of the drug as needed and for high cerebrospinal fluid concentrations of the drug with low plasma concentrations.
- Patients who elect to use the pump require effective education and communication prior to surgery, during the test phase, and while the pump is in place.

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Via the Web: Applicants can access this program at the International Organization of MS Nurses website, www.IOMSN.org. Click on Counseling Points and follow the instructions to complete the online posttest and application forms.

PLEASE SELECT THE BEST ANSWER

1. The classic definition of spasticity is "a velocity-dependent increase in muscle tone and resistance to passive stretch, often with more resistance to: _____."

A. manual pressure
B. slow movement
C. rapid movement
D. flexed muscles

2. Spasticity is believed to be caused by an imbalance between _____ impulses.

A. neuronal and axonal
B. excitatory and inhibitory
C. autonomic nervous system
D. parasympathetic nerve

3. In a patient with spasticity of the hip flexors, the hips and knees would:

A. bend up toward the chest
B. twist toward the left
C. cause the back to arch away from a chair
D. none of the above

4. Spasticity in multiple sclerosis (MS) is unlikely to occur at night, when the patient's muscles are relaxed.

A. True
B. False

5. Possible triggers for increased spasticity in a patient with MS include:

A. urinary tract infection
B. other infections
C. fatigue
D. all of the above

6. The difference between the Ashworth Scale and the Modified Ashworth Scale is:

A. an extra category for mild spasticity, 1+
B. an extra category for moderate spasticity, 3+
C. an extra category for severe spasticity, 5+
D. the addition of category 6 to denote complete paralysis

7. In the nonpharmacologic management of spasticity, the most proven therapeutic approaches are:

A. cold application, massage, and stretching
B. stretching in combination with heat therapy
C. stretching, range-of-motion therapy, and gradual strength training
D. transcutaneous electrical nerve stimulation (TENS) and electrical stimulation approaches

8. Recommended first-line therapies for pharmacologic management of spasticity are:

A. baclofen or tizanidine
B. dantrolene sodium or botulinum toxin
C. diazepam or clonazepam
D. gabapentin or pregabalin

9. Intrathecal therapy allows for high concentrations of baclofen:

A. to cross the blood-brain barrier
B. in circulating white blood cells
C. directly into the muscle affected
D. in the cerebrospinal fluid

10. A long dosage titration period is required after implantation of an intrathecal pump because:

A. the patient must heal from surgery first
B. some patients will not respond to the intrathecal method
C. the dosage must be raised in small increments
D. all of the above

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At the end of this program, I was able to: *(Please circle the appropriate number on the scale.)*

1. Identify signs, symptoms, and triggers of spasticity in multiple sclerosis (MS) 5 4 3 2 1
2. Discuss treatment goals for patients with spasticity, including prevention of complications 5 4 3 2 1
3. Summarize benefits of physical therapy for patients with MS 5 4 3 2 1
4. Analyze the pros and cons of various medical therapies for spasticity in MS 5 4 3 2 1

To what extent was the content…

5. Well-organized and clearly presented 5 4 3 2 1
6. Current and relevant to your area of professional interest 5 4 3 2 1
7. Free of commercial bias 5 4 3 2 1

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_____

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