

TREMOR

Some people with MS experience tremor, an involuntary rhythmic shaking movement of the muscles. The most common type of tremor seen in people with MS is caused by loss of myelin on nerve fibers in the cerebellum, specifically the part called the thalamus which is responsible for voluntary muscle movement and balance.

Tremor can affect the limbs, head, body, or the muscles needed for speech. Some tremors are slight and don't interfere with daily living while other tremors can significantly affect important activities. **Gross tremor** is characterized by wide back and forth motions, usually of the arms or legs. **Intention or action tremors** are activated when a person reaches for something. When tremor is severe, it can prevent a person from eating, writing, speaking clearly, or walking easily.

There is no cure for tremor, and it remains one of the most frustrating MS symptoms. Options for management include physical and occupational therapy techniques, drug therapy, stress management, neurosurgery, and electrode implants. Some

of these options will work for one individual; others will not. Coping with tremor requires patience, good communication with health-care professionals, and some creative problem-solving.

Don Denton, of Lubbock, Texas, has been dealing with intention tremors due to his MS for over 20 years. He's worked as a peer counselor with his chapter of the Society. When he talks to people who have problems with MS tremor, he tells them frankly that there is no easy answer. However, he also reassures them that they may be able to reduce these problems. Don has found some relief with drug therapy. He has also learned strategies that allow him to perform daily tasks better, and he plans ahead so that tremor-related problems don't

take him by surprise. For Don, tremor has become just one piece of his challenging chronic disease.

OCCUPATIONAL AND PHYSICAL THERAPY TECHNIQUES

An occupational therapist or physical therapist is the recommended source for both practical strategies and adaptive aids that can reduce the negative impact of tremor on daily life. Your doctor should be able to refer you to a professional with MS experience—or, call the National MS Society.

Some tremor can be controlled through the use of braces. A rigid brace can control and support an affected limb while a person performs a specific activity. Afterwards, the brace can be removed. In some cases, however, bracing may actually increase spasticity. Consult your rehabilitation specialist.

Some people find it helpful to hold their arms close to the body or to prop an elbow against the chest in order to gain more control over forearm movements. Weights fastened to the wrists or ankles with Velcro strips can stabilize an affected limb. Weighted boots are also an option. Putting weights on canes or walkers, or using weighted spoons or forks can make these tools easier to use when tremor is active. Using weighted devices has to be balanced against the added

fatigue they might cause. Therapists commonly offer samples for a try-out.

Adaptive equipment, such as wrist rests that facilitate writing or typing, and plates and cups with lips to minimize food spills, are also helpful to some people.

Physical or occupational therapists may be able to reduce the effects of tremor by teaching specific positions for some activities or by balance and coordination exercises. These might include repeating a series of movements related to an activity like eating, for example, until those muscles “learn” a pattern sufficiently well to override disruptions of the nervous system. Other exercises might focus on stimulating the balance centers of the brain. Computers can provide biofeedback that helps people recognize balance problems in time to compensate for them.

TREMOR AND SPEECH PROBLEMS

If tremor affects the muscles necessary for speech, a person will want to consult a speech therapist. A speech therapist can show a person how to slow down or concentrate on phrasing so that speech is more intelligible. If this is not possible, a person with speech tremor may need to learn alternative communication skills. Electronic aids, communication charts,

or computer-assisted alternative communication systems are available. However, tremor this severe is not common.

STRESS MANAGEMENT AND TREMOR

People with MS-related tremor may find that the unwanted muscle movements are worse in stressful situations. As Dr. Robert R. Young, professor of neurology at the University of Southern California, explains, "Stress, excitement, and anxiety all result in the body releasing adrenalin which produces a temporary aroused condition. All of us experience it at some time. Stage fright is one example." For people with MS tremor, this temporary condition can make the existing tremor worse.

Stress management techniques can be an essential tool for such situations. Dr. Young would also prescribe an adrenergic blocking agent such as propranolol (Inderal) in pill form for someone who is facing a particularly stressful event such as giving a speech or appearing in public.

DRUG TREATMENTS FOR THE MANAGEMENT OF TREMOR

At present, there are no drug therapies specifically for tremor, but several drugs have been shown to have secondary effects that can be more or less

helpful. Some people respond well to one drug; some benefit from a combination; some find no benefit. People with tremor will have to work patiently with their physicians in investigating which drug therapy might be useful to them.

DRUGS USED TO TREAT TREMOR

[Adapted from *Symptom Management in Multiple Sclerosis*, 3rd Edition, Randall T. Schapiro, MD, 1998, Demos Medical Publishing Co., Inc., p. 48.]

- **Hydroxyzine (Atarax, Vistaril)**
Antihistamine that can help minor tremor worsened by stress
- **Clonazepam (Klonopin)**
Anti-anxiety agent with sedative effect
- **Propranolol (Inderal)**
Beta-blocker that provides modest relief for some tremor
- **Buspirone (Buspar)**
Anti-anxiety agent with some anti-tremor effect
- **Ondansetron (Zofran)**
Anti-nausea drug with anti-tremor effect, but very expensive
- **Primidone (Mysoline)**
Antiepileptic drug with some anti-tremor effect in low doses; heavy sedating effect
- **Acetazolamide (Diamox)**
Diuretic; some help for postural tremor

Other drugs include gabapentin (Neurontin), isoniazid (Laniazid, in the US; Isotamine in Canada); and trihexyphenidyl (Artane). Some gross tremor can also be treated with baclofen, which is primarily an agent for treating spasticity.

Researchers are studying the effect of marijuana on tremor. Preliminary studies in lab animals support the stories some people tell about tremor relief from marijuana. However, until an alternative delivery system can be developed to protect lungs from smoke damage, it remains a dangerous as well as an unproven and illegal therapy.

The National MS Society recommends that people diagnosed with a relapsing-remitting course of MS begin treatment with one of the disease-modulating drugs. These drugs may not have any direct effect on existing symptoms, including tremor, but they slow down the progress of the disease and help avoid additional damage to central nervous system tissue.

THALAMOTOMY AND DEEP BRAIN STIMULATION

Tremor in MS occurs when there is damage to nerve fibers in the section of the brain called the thalamus. A neurosurgical technique called thalamotomy involves permanently des-

troying targeted nerve tissue in the thalamus. Thalamotomy can be performed with a gamma knife, a machine that focuses gamma radiation on a very small point to destroy targeted tissue. Performed without open-skull surgery or anesthesia, the procedure is considered to be low risk. The benefits are more problematic. About two-thirds of people with MS benefit from this procedure, but many people find that their tremor returns. Because thalamotomy is not reversible and the positive effects may lessen or stop over time, many physicians are reluctant to recommend it.

There has been some success reported in the treatment of MS tremor with electrode stimulation of areas in the thalamus. This is called deep brain stimulation or DBS. A tiny electrode is implanted in a carefully targeted area of the thalamus during open-skull surgery. The electrode is connected to a wire lead that is inserted under the skin of the neck. It connects to a control device inserted under the skin in the chest area. This device is programmed to send impulses to the electrode in the brain. These impulses interfere with the nerve signals that are causing muscles to make involuntary tremor movements.

DBS was originally developed for the treatment of tremor due to Parkinson's disease. It is still a new therapy and is not yet FDA-approved for MS tremor. When it is used to treat

tremor of the arm, it is unilateral. Only one arm can be treated and the person must choose which one. Thalamic stimulation to manage leg tremor is also still in the experimental stage.

Dr. Erwin B. Montgomery, Jr., director of the Movement Disorders Program and co-director of the Center for Functional and Restorative Neuroscience at The Cleveland Clinic Foundation, has performed approximately 40 DBS operations for people with MS. He is enthusiastic about this new neurosurgical technology but he also cautions people to have reasonable expectations about the procedure. While DBS can significantly reduce tremor, it doesn't abolish the symptom completely. Like any surgery, this procedure has risks—a 2-3% risk of serious complications due to the surgery itself. Over time, DBS recipients tend to build up tolerance to a particular electronic signal. This means that they must frequently return to their doctor's office to have the impulse generator reset, either to a higher or lower level. This is done using non-invasive radio signals. Dr. Montgomery advises his patients to keep all this in mind when they assess the risks and benefits.

Andrea Tucker, of Columbus, Ohio, made the assessment and decided that the benefits would outweigh the risk of complications and the bother of frequent office visits. She was often unable to feed herself or to write due

to intention tremor in her arms. She had tried drug therapies, but found no relief. The fact that the DBS procedure is reversible helped her decide to try it. In 2000, she had the operation. Since then, Tucker is eating and writing again. At first, it was necessary to get her impulse generator reset every few months, but now this occurs less frequently. She does not find her implanted device noticeable or intrusive, but she has noticed that her problems with gait seem to increase when the device is turned on. Tucker simply turns it off when she needs to walk.

COPING WITH TREMOR OVER THE LONG TERM

It can be maddening to feel that your own body is no longer in your control. Many people feel painfully embarrassed when other people witness their tremor. Simple changes—like grasping a glass with two hands instead of one—can be a big help. Don Denton handles embarrassment by being up-front with people about all his MS symptoms, including tremor. When ordering coffee at a restaurant, he'll tell the waitperson, "I can't always control my hand shaking, so pour me half a cup—otherwise, I'm going to spill some." Denton also knows that his tremor can increase with fatigue, so he'll try to plan certain activities for earlier in the day.

If tremor is having an impact on your social life, making you wary about going out in public, a professional therapist or counselor may help you arrive at more acceptable solutions.

KEEP TRYING

It's hard to predict which strategies will work for an individual's tremor. Tremor can interfere with sexual function, and can be discussed with a PT, OT, or healthcare provider. If balance exercises fail, try biofeedback. If one drug has no effect, or the side effects are too troublesome, talk to your doctor about other options. Celebrate every moment of progress—whether it's learning the exact angle needed to sign your name clearly or reaping benefits from Swiss ball balance exercises.

In dealing with this frustrating symptom, make use of all the available resources. These include a responsive health-care team—therapists, nurses, and counselors as well as your physician, your family and friends, and the National MS Society chapter nearest you. Educate yourself and those closest to you about

tremor and all the possible therapies for it, including creative coping. And try to keep tremor in perspective.

Drug therapies and neurosurgical technologies now offer somewhat better outcomes for long-term management of tremor in MS. New developments are expected from research. There is hope for the future. But until improvements come to fruition, people who live with tremor will continue to piece together the coping strategies that best address their own situations.

Written by Lorna Smedman, PhD.
Reviewed by the Client Education
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Society's Medical Advisory Board.

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