



Because knowledge is essential to making informed choices, we've developed this glossary to help ET patients, their loved ones, and caregivers better understand the terms healthcare providers may use in treating ET. Because managing your treatment plan effectively is essential to a good patient-physician relationship, you must be informed about your condition so you can continue to seek new information that may be helpful to you and your health. We've designed this glossary for easy access to the words, terms, and procedures listed alphabetically. We suggest you read through it and then keep it handy for future reference.

### Accelerometry

This is a method of measuring tremor using electronic motion detectors attached to the most tremulous body parts, typically the fingers or arms, legs, head, and occasionally the trunk. Accelerometers indirectly measure how fast the body or limb moves.

### Action tremor

An action tremor is one that occurs during action as when performing a certain task such as reaching for an object, or bringing the object towards you. For example, a tremor that occurs when reaching for a cup or bringing a cup to the mouth.

### Acupuncture

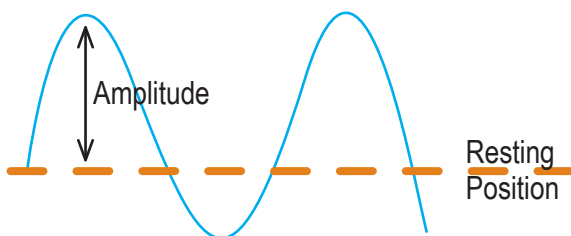
Acupuncture is an ancient Chinese therapy in which needles are inserted into certain points on the body in an attempt to control disease or pain. Acupuncture is considered as an alternative (non-traditional) form of treatment for many disorders.

### Alcohol

Consumption of alcohol may reduce tremor in many ET patients. Response to alcohol may be helpful to the physician in the diagnosis of ET vs. other causes of tremor. The effect of alcohol generally lasts only a few hours and excessive alcohol can actually worsen tremor. Alcohol should be used in moderation and responsibly to avoid injury or addiction.

### Amplitude

Amplitude is the amount or range of movement caused by the tremor of a body part. Amplitude is most often measured in centimeters or inches.



### Anterocollis

Anterocollis is a form of dystonia in which the neck muscles spasm (contract) and pull the head toward the chest.

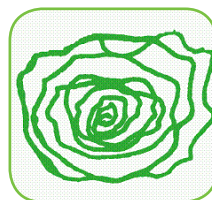
### Anxiety

Anxiety is a fundamental physiologic response to stress. Symptoms may include feeling of worry, rapid heart rate, shortness of breath, brief period of tingling sensations, as well as tremor. Virtually all types of tremor are aggravated by stress and anxiety.

### Archimedes Spiral

This is a test commonly used to evaluate tremor. The patient is asked to draw a spiral without their hand touching a surface, through which the physician can determine the severity of the tremor. This simple, inexpensive test is also valuable in determining the effects of a drug on tremor.

The patient may be asked to draw the spiral before and after receiving a drug in order for the physician to evaluate the effect of the drug on the patient's tremor and at what dosages the drug is most effective.



Spiral drawn by a patient receiving no drug.



Spiral drawn by a patient receiving a trial dose of a drug.



Spiral drawn by a patient receiving a more effective dose of the same drug.

### Ataxia

Ataxia is a neurological symptom that has many causes. It usually results in poor coordination, clumsiness, and abnormal walking in such a way that the feet are wide apart. Walking may resemble that of someone who is intoxicated. ET patients may experience mild ataxia.

### Autonomic nervous system

This is the part of the nervous system responsible for involuntary (not under your control) functions of the body such as heart rate, blood pressure, sweating, bowel and bladder control.

### Autosomal dominant inheritance

A form of inheritance in which a disease can be passed on from one generation to the next and can be seen in every generation in both men and women. In this form of inheritance, the affected individual has received only one copy of the specific gene from one parent. But that one copy of the gene is enough to cause the specific disease. Individuals with autosomal dominant diseases have a 50-50 chance of passing the disease on to each of their children. ET is an example of an autosomal dominant disorder.

### Autosomal recessive inheritance

Autosomal recessive inheritance is a pattern of inheritance in which for a person to be affected, they must receive a copy of the affected gene from both of their parents. That means both parents must be carriers of the affected gene. Autosomal recessive disorders generally don't occur in every generation. If both parents are carriers of the affected gene, each child has a 25% chance of getting the disease. For example, Sickle cell anemia is an autosomal recessive disorder.

### Axon

This is the part of a neuron (nerve cell) that transmits information from one neuron to another. (See *Neuron* for diagram.)

### Benzodiazepines

Benzodiazepines are a class of drug used to treat several neurological disorders. Their mechanism of action includes calming or depression of the central nervous system. They are used to treat certain types of seizures, muscle spasms, and anxiety. They can also be used as sedatives. They have been shown to help tremor to some degree. They can be habit-forming and tolerance to the medication can occur with chronic use. Clonazepam (Klonopin®), diazepam (Valium®), lorazepam (Ativan®), and alprazolam (Xanax®) are examples of benzodiazepines.

### Basal Ganglia

Deep structures in the brain with some of their core functions involving initiation of movement and suppressing unwanted movements. It is composed of the caudate nucleus, putamin and globus pallidus. (See *Cerebellum* for diagram.)

### Beta-blockers

Also known as Beta-adrenergic blockers, beta-blockers are a class of drugs that block beta receptors in the brain. Beta-blockers decrease the effect of the sympathetic part of the autonomic nervous system and are commonly used to reduce high blood pressure and treat migraine. They can also suppress tremors in many patients with ET. There are several types of beta receptors. It is thought that the development of drugs that could act specifically on individual beta receptors would lead to more effective tremor control. Propranolol (Inderal®) is a beta-blocking drug.

### Biofeedback

Biofeedback is a form of relaxation therapy in which body functions such as heart beat or breathing rate are consciously controlled through feedback from an outside device such as a heart monitor.

### Blepharospasm

Blepharospasm is a form of dystonia in which spasms of muscles around the eye lead to uncontrolled eye closing or excessive blinking.

### BOTOX®

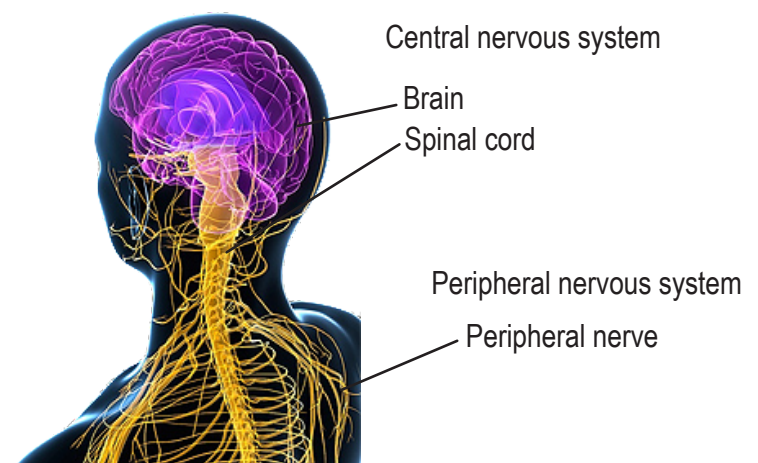
A form of botulinum toxin type A.

### Botulinum toxin

Botulinum toxin is a toxin produced by bacteria often associated with food poisoning (botulism). It is injected in very small doses into the muscles to reduce their hyperactivity. It is used to treat some types of dystonia and tremor. It is marketed for this purpose as BOTOX® (botulinum toxin type A), Dysport® (botulinum toxin type A), Xeomin® (botulinum toxin type A) and MYOBLOC® (botulinum toxin type B). It can be used to reduce/treat head tremor that is not responsive to ET medications or DBS.

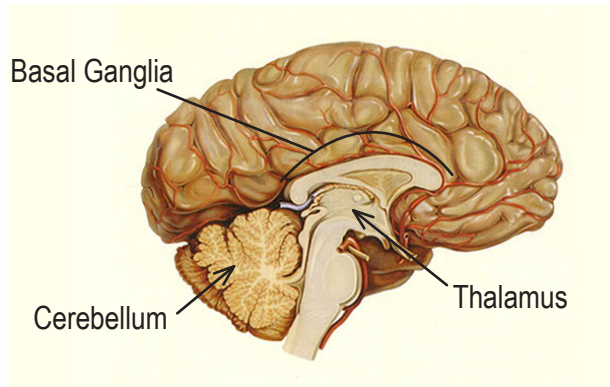
### Central nervous system (CNS)

The CNS is made up of the brain and spinal cord. It controls voluntary acts, consciousness, and mental activities.



## Cerebellum

The cerebellum is an area of the brain and is involved in many functions including coordination of movements, balance, and speech. Damage to the cerebellum can result in clumsiness and in action tremor. Studies have shown that the cerebellum may be involved in ET.



## Cerebellar tremor (See intention tremor.)

For full expression, cerebellar tremor requires performance of an exact, precise movement. Tremor is absent when the limbs are at rest and during the first part of voluntary movement. As the action continues, however, and fine adjustments are demanded (for example, touching the tip of the nose or the examiner's finger) an irregular, moderate to severe tremor develops upon reaching the target.

## Chorea

Chorea involves abnormal, jerky movements that are unpredictable and occur in the arms, legs and face, randomly and frequently. They also may look "dance-like". Those affected may seem initially fidgety. They are the most common involuntary movement seen in Huntington's disease and are not seen in ET.

## Chromosome

Chromosomes are contained in the nucleus of each cell. At conception, we receive an equal number of chromosomes (23) from each parent. Genes/genetic information are on the chromosomes. (See *Gene* for diagram.)

## Clinical trial

A clinical trial is a prospective study in humans that compares the value of one or more therapeutic interventions with a control. A control is generally a person who does not receive the therapeutic intervention but instead a placebo or sugar pill.

## Clonazepam (Klonopin®)

Clonazepam is a benzodiazepine. It is used for a variety of symptoms including anxiety, insomnia, seizure and tremor. It can be quite effective in orthostatic tremor.

## Computerized tomography (CT scan)

CT of the brain is a form of x-ray that allows the visualization of different brain structures and helps to differentiate diseased brain tissue from healthy brain tissue.

## Control group

A control group provides a formal comparison to the group of individuals being given the study medication in a clinical trial. For instance, evaluating the true effects of the trial medication requires concurrent examination of a control group of subjects who are not given the medication compared with the group of subjects who are receiving the trial medication. The control group is often given an inert medication (placebo).

## Deep Brain Stimulation (DBS)

DBS is an adaptable therapy that uses mild electric pulses to stimulate the brain and block the signals that cause tremor. Therapy includes implanting an insulated wire lead in the thalamus (structure targeted for ET). The lead is connected to a pulse generator or battery (like a cardiac pacemaker) implanted beneath the skin in the chest. Physicians and trained health care providers activate and adjust the system. The patient can also turn the stimulation on and off with a patient programming unit or a hand held magnet. All parts of the system are under the skin.

## Dendrite

A dendrite is the part of the neuron that receives information from other neurons. (See *Neuron* for diagram.)

## Deoxyribonucleic acid (DNA)

DNA is the genetic material inside the nucleus of a cell that dictates how that cell will function. The genetic information is copied and passed on to future cells in that cell line.

## Dysport®

A form of botulinum toxin type A.

## Dystonia

Dystonia is an abnormal muscle contraction causing a person to maintain an involuntary, abnormal posture, or twisting of a limb. A common example of dystonia is cervical dystonia when the neck has a tendency to pull in one direction.

## Dystonic tremor

A person with dystonia may also experience tremor in the dystonic body part. This is known as dystonic tremor. It is commonly seen with head tremor.

## Electroencephalography (EEG)

EEG gives information of how the various regions of the brain are functioning. It is used to look for seizures or any areas of the brain that may not be functioning properly.

### Electromyography (EMG)

EMG detects electrical charges from muscle contractions by means of electrodes near or within the muscle.

### Essential tremor (ET)

ET is a disorder causing action tremor with a frequency ranging from 4 to 10 cycles per second (4 to 10 Hz). It typically involves both hands when arms are stretched out holding an object or reaching for an object. It can also involve the head and the voice.

### Frequency

Because tremor is a rhythmical movement, it completes a cycle in the same way as does a clock pendulum. It swings in a direction and returns to its starting point, then swings out again and returns to its starting point, etc. The frequency of a tremor is the number of cycles it completes in a second. Frequency is measured in hertz. ET usually has a frequency of 4 to 10 hertz.

### Gamma knife thalamotomy

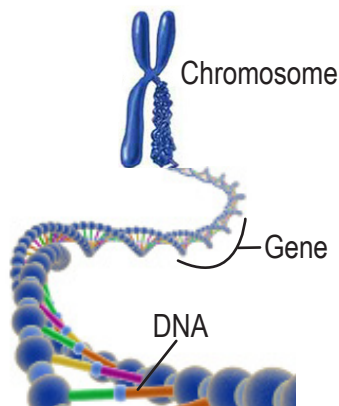
Gamma knife thalamotomy is a form of thalamotomy in which the area of the brain involved in tremor production is destroyed by creating a lesion by radiation beams. It can be very effective in reducing or diminishing tremor. The results may take several weeks to be seen and it is an irreversible procedure. It is used in patients who are very old or not good surgical candidates for DBS implantation.

### Gabapentin (Neurontin®)

Gabapentin is an anti-seizure medication that can be used to treat ET.

### Gene

Genes are the basis of heredity. Through a chemical called DNA, genes direct the information that determines all our characteristics such as how we look, color of our eyes, our height, formation of inner organs, etc., as well as the development of genetic diseases.



### Genetic counseling

Families with genetic disorders can obtain specialized counseling from trained professionals to learn about the likelihood they or their children might develop the disorder.

### Globus pallidus

This is a component of the brain's basal ganglia that works with the thalamus and other areas of the brain to control movement.

### Head tremor

Most people who have head tremor actually have neck tremor that causes their heads to shake. With a yes-yes head tremor, the head nods up and down as if the person were saying yes. With a no-no head tremor, the head shakes from side to side as if the person were saying no. Some patients have head movement in all directions. Head tremor is seen in ET and dystonia.

### Holmes tremor

Damage to the pathways that leave the cerebellum often result in a severe form of tremor that is usually present at rest, worsens when the person attempts to maintain a posture, and can become quite extreme on attempting to perform an action. This type of tremor is known by many terms including Holmes tremor, rubral tremor, and midbrain tremor.

**Inderal®** (See propranolol.)

### Intention tremor (See also cerebellar tremor)

This tremor occurs throughout the course of an action and worsens as the individual reaches the target. Such tremors are usually indicative of disease in the part of the brain known as the cerebellum or its connections.

### Isometric tremor

This type of tremor appears when muscles contract against a rigid, stationary object such as when a person pushes on a surface to support body weight.

### Jaw tremor

Tremor of the jaw is usually a manifestation of Parkinson's disease.

### Kinetic tremor

The word kinetic is derived from the Greek word for movement. A kinetic tremor increases when the person attempts to perform an activity such as lifting a glass to drink or a spoon to eat. It is a kind of tremor that occurs with movement.

### Magnetic resonance imaging (MRI)

This scan uses magnetic fields to produce detailed images of the brain or other body parts.

**Midbrain tremor** (See Holmes tremor.)

### Mirtazapine (Remeron®)

Mirtazapine is an anti-depressant that has limited effectiveness in ET but can be helpful for some patients.

### MYOBLOC®

A form of botulinum toxin type B.

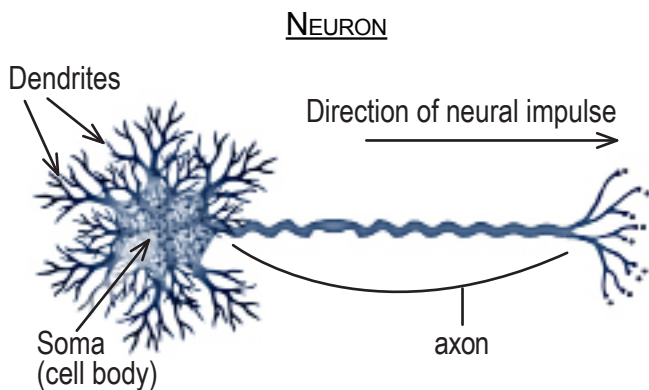
### Myoclonus

Myoclonus is an involuntary movement that is a sudden, lightning-like muscle jerk originating in the central nervous system (CNS). Most people experience the occasional jerk while falling asleep – it feels as if a limb or other body part suddenly tugs at itself. People who have myoclonus as a disorder or as a symptom of a disorder experience these jerks far more frequently both while awake and asleep or with certain activity.

**Mysoline®** (See primidone.)

### Neuron

A neuron is a nerve cell made up of three parts. Dendrites with receptor sites receive information from other cells, a cell body integrates the information from all the receptor sites, and an axon releases neurotransmitters to pass on information.



**Neurontin®** (See gabapentin.)

### Neuropsychologist

A neuropsychologist is a psychologist who specializes in the study of how behavior and mental functioning are related to brain function and structure.

### Neurotoxin

A neurotoxin is an agent that alters, damages or destroys cells in the nervous system.

### Neurotransmitters

Neurotransmitters are specialized chemicals produced in neurons that help carry information from one neuron to another.

### Occupational cramp

These are dystonic movements (muscle spasms) in a body part used frequently for a specific purpose. Examples are cramps in the fingers of a pianist and writer's cramp.

### Orthostatic tremor

The development of a tremor involving the upper legs, buttocks, and lower trunk after standing for a period of time is characteristic of orthostatic tremor. The tremor subsides when the individual sits, leans against something, or walks.

### Pallidotomy

Pallidotomy, a brain surgery performed for Parkinson's disease, involves destroying part of the globus pallidus to alleviate symptoms.

### Parkinson's Disease (PD)

A neurodegenerative disease characterized by resting tremor (in hands or legs), bradykinesia (or slowness of movements), rigidity (stiffness), postural instability leading to falls and balance impairment. Not all patients have tremor. Tremor generally starts on one side of the body and progresses to the other as the disease progresses.

### Parkinsonism

Parkinson's disease is the most common cause of parkinsonism which is characterized by slowed movement, stiffness, tremor and difficulties with walking and balance. It can be caused by medications, vascular disease and other disorders with symptoms similar to Parkinson's disease but a poor response to medications.

### Pathologic tremor

Pathologic tremor is a tremor caused by a disease or disorder of the nervous system.

### Peripheral nervous system (PNS)

The PNS is a part of the nervous system that is outside of the brain and spinal cord. This includes the nerves coming out of the spinal cord, their branches, and smaller nerves that eventually connect to the muscles. (See CNS for diagram.)

### Physiologic tremor

Physiologic tremor is a normal tremor that can occur in all individuals during stressful situations such as speaking in front of a crowd or feeling afraid /anxious or after consuming a large amount of caffeine.

### Placebo

Placebos are substances that contain no active ingredients and are prepared to appear and taste like the active substance but not to exert any pharmacologic activity. Placebos are often referred to as sugar pills because most contain lactose sugar as the major ingredient. Placebos are used in clinical trials to determine the actual effect of a drug/treatment.

### Positron emission tomography (PET) scan

This is an advanced scan that can detect and produce images of brain chemical activity.

### Post-traumatic tremor

Post-traumatic tremor is a tremor that results from a head injury. The tremor usually occurs within weeks or months but may be up to a year after the injury.

### Postural tremor

This is a tremor that occurs while the person voluntarily maintains a position against gravity. It is present when the individual holds his or her hands out-stretched in front. This tremor is often present in ET.

### Primary writing tremor

This tremor of the hand occurs only while the person is writing. Primary writing tremor is recognized as a disorder distinct from ET.

### Primidone (Mysoline®)

Primidone is a drug originally used to control epileptic seizures. It is similar to barbiturates, a large group of drugs that include varied sedative, hypnotic, and antiepileptic agents. Primidone effectively controls tremor in many patients. Some patients who do not respond to propranolol will respond to primidone.

### Propranolol (Inderal®, Inderide®)

Propranolol is a beta-adrenergic blocker. These drugs have been used for many years to treat various heart conditions, blood pressure, and chronic migraine. Propranolol is widely used and is an effective treatment for ET. It is the only medication currently approved for the treatment of essential tremor.

### Psychogenic tremor

Psychogenic tremor is associated with some form of psychiatric stressors/mental trauma. It does not have the characteristics including frequency and amplitude of tremor seen in known organic causes of tremor. It generally does not respond to typical medications for tremor.

### Remeron® (See mirtazapine.)

### Resting tremor

Resting tremor occurs while the affected body part is completely at rest and no muscles are being moved voluntarily. This tremor is characteristic of Parkinson's disease. It can be seen in the arms and legs while sitting.

### Retrocollis

Retrocollis is the result of muscle spasms (dystonia) that pull the head toward the back.

### Rubral tremor (See Holmes tremor.)

### Sporadic occurrence

Sporadic occurrence refers to the development of a disease in an individual with no family history of the disease. In other words, the disease appears to occur by chance. ET can be either sporadic or inherited.

### Thalamotomy

Thalamotomy is a type of brain surgery that involves making a lesion (controlled destruction of brain tissue) the size of a pea in the thalamus to alleviate tremor. Thalamotomy has been shown to effectively reduce tremor in ET.

### Thalamus

The thalamus is a deep structure of the brain. It is a major relay area of the brain that receives and sends information to various brain structures. It is thought there are many pathways in the brain that govern movement that are connected to this brain structure. Deep-brain stimulation or lesions of the thalamus can reduce tremor. (See *Cerebellum* for diagram.)

### Tics

Tics can be motor or phonic. They involve involuntary, repetitive movement or a series of movements with or without sound/verbal output. They include movements of the face, the limbs, trunk, repeatedly. They can be suppressed for a few seconds/minutes, but eventually they have to come out and often stronger than before. They are associated with obsessive-compulsive disorder (OCD), Tourette's syndrome (TS), and attention deficit hyperactivity disorder (ADHD).

### Tone

Tone is the resistance noted by the examiner when a limb or other body part is moved passively (moved by the examiner and not the examinee) about the joint.

### Topiramate (Topamax®)

Topiramate is an anti-seizure drug that has been shown to be effective in controlling ET in some patients. Patients should begin with low doses and slowly increase the dosage over time to minimize side effects, which include numbness or tingling, word-finding difficulty, weight loss, and possibly kidney stones in people at risk.

### Torticollis

Torticollis involves twisting/turning movements of the head to one side. This is a type of cervical dystonia.

### Tremor

Tremor is a rhythmical, oscillatory (swinging) movement of a body part.

### Vocal tremor (voice tremor)

Vocal tremor causes a characteristic quivering of the voice, most evident when attempting to sustain a long note. Voice tremor is often seen in ET.

### Xeomin®

A form of botulinum toxin type A.

A special thank you goes to **Dr. Kelly Lyons**, Director of Research for the Parkinson's Disease and Movement Disorder Center at University of Kansas Medical Center in Kansas City, Kansas and IETF Board President, and **Dr. Arshia Sadreddin**, Movement Disorder Neurologist at Barrow Neurological Institute, St. Joseph's Hospital and Medical Center in Phoenix, Arizona and IETF Medical Advisory Board Member, for taking the time to write and review the information presented in this glossary.

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This information is not intended to replace your current medical therapy. Discuss your difficulties with your physician or other healthcare professional in order to help develop a well-rounded treatment plan that is right for you.



The mission of the International Essential Tremor Foundation (IETF) is to provide hope to the essential tremor (ET) community worldwide through awareness, education, support, and research.

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