Tremors:

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ABSTRACT: During the history taking, pay particular attention to pharmacologic and toxic exposures; among the medications and substances associated with tremor are β-adrenergic agonists, stimulants, psychotropic agents, anticonvulsants, dopamine agonists, methylxanthine, and heavy metals. During the examination, observe the amplitude, frequency, and rhythm of the tremor. In contrast to physiologic tremors, which have low amplitude and high frequency, pathologic tremors typically have a higher amplitude and lower frequency. Tremors can be classified as resting, postural, or action. Resting tremor is almost always associated with other features of Parkinson disease, while postural and action tremors are prominent features of essential tremor. When essential tremor interferes with normal daily functioning, treatment is indicated. β-Adrenergic antagonists, anticonvulsants, benzodiazepines, primidone, and nimodipine have been used in this setting. If these medications are ineffective, consider botulinum toxin A or surgery.

Although tremors are commonly encountered in primary care, they can be difficult to identify and treat. Appropriate management depends on an accurate diagnosis. Here we describe key findings in the history and physical examination that point to the cause of tremors. We also discuss major advances in treatment that have been introduced in recent years.

EVALUATION OF TREMOR

Tremor is defined as a regular, rhythmic oscillatory movement that results from either alternating or simultaneous contraction of agonist and antagonist muscle groups. It usually affects the distal extremities (especially fingers and hands), head, tongue, and jaw; rarely, the trunk is affected. Regardless of the size of the muscles involved, the tremor is usually consistent in all the affected parts. Tremors occur only while the patient is awake.

History. A comprehensive personal and family history is essential. The psychiatric, endocrine, and metabolic disorders listed in Table 1 can cause or exacerbate tremor. Pay particular attention to pharmacologic and toxic exposures; among the medications and substances that have been associated with tremor are β-adrenergic agonists, stimulants, psychotropic agents, anticonvulsants, dopamine agonists, methylxanthine, and heavy metals (Table 2).

Examination. Observe the amplitude, frequency, and rhythm of the tremor. In contrast to nonpathologic or physiologic tremors, which have low amplitude and high frequency, pathologic tremors typically have a higher amplitude and lower frequency.

Classification. Tremors can be classified as resting, postural, or action based on the situation in which they occur (Table 3). Resting tremor is almost always associated with other features of Parkinson disease, while postural and action tremors are prominent features of essential tremor. There are variants of these basic tremor types as well as rarer forms of tremor that are beyond the scope of this review.

PHYSIOLOGIC, OR NONPATHOLOGIC, TREMOR

This tremor normally occurs when a person attempts to maintain posture. The frequency is 8 to 12 Hz in the hands, but it may be slower in other body parts. Physiologic tremor frequently decreases with age.

The conditions outlined in Table 1 and the agents listed in Table 2 can increase or aggravate physiologic tremor. Treatment of these underlying conditions or withdrawal of these medications usually leads to the reversal of tremor. Some patients may respond to β-adrenergic blocking agents, such as propranolol.

TREMOR IN PARKINSON DISEASE

Approximately 1 million Americans have Parkinson disease. The prevalence is 1% among patients aged 65 years and older, and 2% among those aged 85 years and older. The symptoms of Parkinson disease are complex; they include tremor, rigidity, bradykinesia, and postural instability. About 50% of patients with Parkinson disease present with tremor, although 10% never experience a tremor. Resting tremor is a classic feature of the disease; it consists of
adduction-abduction of the hands and fingers; it can also involve the legs, jaw, and lips. The characteristic "pill-rolling" tremor is a combination of flexion-extension in coordination with adduction-abduction of the thumb. Postural tremor can also occur.

A comprehensive discussion of the treatment of Parkinson disease is beyond the scope of this article; however, a postural tremor in this setting can be treated with propranolol, in daily divided doses of 80 to 320 mg.

**ESSENTIAL TREMOR**

Essential tremor is primarily a postural tremor, but it may occur during movement if postural alignment is required. The onset is gradual, and it predominantly affects the upper extremities. The face, vocal cords, head, trunk, and legs may also be involved.

At least 10 million persons in the United States (as many as 1 in 20 Americans older than age 40 and 1 in 5 Americans over age 65) have essential tremor, which is considered the most common movement disorder. Because many persons who have a mild tremor do not seek medical treatment, its prevalence may be underestimated.

Essential tremor is familial and has an autosomal dominant pattern in 50% of affected patients. The incidence of essential tremor increases with age, and a bimodal distribution has been reported, with peak onset at ages 15 and 60 years.

**Variants.** A variant of essential tremor called orthostatic tremor is manifested by rhythmic shaking of the trunk and legs in the standing position, which disappears in the prone and sitting positions and during walking. Primary writing tremor is another variant of essential tremor in which the activity of writing elicits a pronation-supination tremor that is absent in other movements. Essential tremor can also be associated with such conditions as writers' cramp, cervical dystonia, and spasmodic dystonia.

In 30% to 60% of patients, essential tremor is suppressed by alcohol consumption. This was used as a diagnostic test in the past, but it is no longer considered specific for essential tremor because alcohol may exert this effect on other movement disorders.

**Treatment.** When essential tremor interferes with normal daily functioning, treatment is indicated. The various agents used in this setting (including dosages, side effects, and contraindications) are listed in Table 4. When these medications are ineffective, consider botulinum toxin A, which has been used to treat essential tremor of the head and limbs. Ventrolateral thalamotomy, which is performed by thermocoagulation, and deep brain stimulation of the thalamus, which is performed by the local implantation of a pulse generator, are used in selected severe cases of essential tremor that fail to respond to pharmacologic interventions.

**OTHER TYPES OF PATHOLOGIC TREMORS**

**Spasmodic torticollis.** This condition, which is associated with basal ganglia diseases, manifests as a symptom complex that includes dystonia and tremor. Botulinum toxin A has been used to treat patients with spasmodic torticollis.

**Wilson disease.** Tremors that occur with postural and kinetic movements in the proximal muscles as well as in the shoulder ("wing beating") are often the presenting symptoms of Wilson disease. The administration of penicillamine may diminish the tremor of this disease.

**Cerebellar disease.** Cerebellar tremors occur as a result of lesions in the lateral cerebellar nucleus or the superior cerebellar peduncle. Lesions of the midbrain around the mid nucleus as well as the vermis can also cause these tremors. The most common cause, however, is multiple sclerosis. No effective treatment exists for cerebellar tremors.

**Peripheral neuropathy.** Several conditions can cause peripheral neuropathy, including diabetes, porphyria, anemia, uremia, diseases of the anterior horn cells, toxic exposure to chemicals such as Agent Orange, liver diseases, and demyelinating hereditary neuropathies. The tremor of peripheral neuropathy is clinically similar to essential tremor. Anticonvulsants (eg, primidone, phenytoin, carbamazepine, divalproex sodium, gabapentin, and lamotrigine); benzodiazepines; and muscle relaxants, such as baclofen, have all been used as adjunctive symptomatic therapy in conjunction with treatment of the underlying causes of neuropathy. However, as outlined in Table 2, phenytoin and valproic acid can induce or exacerbate tremor.

**Post-traumatic tremor.** The tremor usually appears within a few months of a head injury. It is frequently proximal to the injury and worsens with movement. Propranolol and stereotactic thalamotomy have been used to treat this condition.

**References:**

REFERENCES:


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