Practical tips on diagnosing and managing tremor

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Tremor is a common complaint but making a definitive diagnosis can be difficult. This review offers practical tips on how to differentiate different tremor types and reviews current treatment options.

Tremor is defined as a rhythmic oscillation of a body part. While tremor is a common complaint, making a definitive diagnosis can be difficult. This is because the diagnosis often relies upon clinical observation rather than diagnostic investigations.

Classification of tremor
Tremor can be classified according to the frequency of the oscillation (e.g., 4–6 Hz for Parkinsonian tremor) but estimating frequencies can be difficult for the non-specialist. It is therefore easier to describe the tremor in terms of the affected body part (see Table 1) and by the predominant context in which it occurs (e.g., at rest, on posture, on movement) as this will help narrow the differential diagnosis.

History and examination
The history should probe age at onset, body part or parts affected, whether the onset was sudden or gradual, drug history, whether the tremor has progressed, the presence of exacerbating and relieving factors, associated neurologic symptoms, family history, and the level of impairment from the tremor to help make treatment decisions and monitor progress.

Rest tremor
Parkinsonian tremor
The commonest cause of rest tremor is Parkinson’s disease (PD), but it is important not to attribute all rest tremor to PD (see Table 2). The tremor of PD typically starts on one side of the body before progressing to involve both sides. It commonly involves the thumb and index finger giving rise to the “pill-rolling” appearance, and is more common when patients are distracted or walking. However, some patients may have more prominent wrist flexion/extension or forearm pronation/supination tremor.

In many patients with PD, a tremor on posture appears after a few seconds of holding their arms in front of them, termed “re-emergent tremor”. Patients may have a tremor outside the arms, most commonly the leg, jaw or lips, but head tremor is not a typical feature of PD.

Finally, it should be remembered that tremor is not a cardinal feature of PD, as rigidity and bradykinesia are, and that approximately 40 per cent of PD patients do not have tremor.
Postural/kinetic tremor

Many of the causes of a postural tremor will also cause a tremor that is worse on movement (kinetic) so these are covered together in this section.

Essential tremor

The commonest cause of a postural tremor is essential tremor (ET), but there are other diagnostic possibilities (see Table 2). ET presents later in life, usually in the sixth or seventh decade. Although there may be a bimodal peak of onset with patients presenting in their 20s, younger-onset cases are rare. ET is defined as a bilateral, symmetrical postural (and kinetic) tremor involving the hands and forearms. There should be no associated neurological features and the tremor progresses slowly over years. A proportion of patients may report improvement in the tremor with a small amount of alcohol, but this is not a pathognomonic feature. There may be a dominant family history. It is not unusual for patients with ET to have tremor affecting other body regions, particularly the head and jaw, but usually not in isolation.

Dystonic tremor

Dystonia refers to an abnormality of posture, and may affect any body region. Such patients may also have tremor affecting the dystonic body part, so-called dystonic tremor. This is a jerky tremor that tends to be position-specific [e.g. only present or worsening in specific positions]. Dystonic tremor may also be task-specific (e.g. only occurring when writing (“writer’s tremor”), or when playing a musical instrument (“musician’s tremor”). The classification of tremor in patients with task-specific tremor but without evidence of focal dystonia is more difficult, without an agreed consensus among specialists as to whether these tremors are truly dystonic or not.

Physiologic tremor

Another common cause of postural tremor is enhanced physiologic tremor. This is a fine, high-frequency (7–12Hz) tremor that is almost universal and is worsened by anxiety, fatigue, coffee and nicotine. A number of drugs, metabolic disturbances and inherited conditions may also cause a postural tremor (see Table 2).

An important, though uncommon, cause of postural leg tremor is orthostatic tremor. This condition presents with an intense sensation of imbalance on standing that improves when walking or sitting. It is characterised by a very high-frequency tremor (typically 13–16Hz) that occurs exclusively on standing. Symptoms typically worsen slowly over time, and a postural arm tremor may also occur.

Intention tremor

The difference between intention tremor and a pure kinetic tremor is subtle but relates to whether tremor only occurs during movement (kinetic tremor; see Table 2), or whether it is only present or clearly worsens, at the end of a movement (intention tremor). This can be specifically tested with the finger-nose test where tremor may worsen as the finger approaches the examiner’s finger or the patient’s nose. Most isolated intention tremor is caused by cerebellar disease such as structural lesions, idiopathic degeneration or toxicity (e.g. alcohol or phenytoin). Of note, head tremor is a common feature of degenerative cerebellar disease.

Intention tremor may co-exist with resting and postural tremor. Thus, a “rubral” tremor (or Holmes tremor) consists of a unilateral tremor that is present at rest, worsens on posture, and is even worse on movement. It is typically related to ipsilateral brainstem pathology, usually in the midbrain.

Wilson’s disease may present with a mixed type of tremor, often with severe worsening when the patient is asked to hold the arms in front, flexed at the elbows. This inherited disorder of copper metabolism is usually associated with a number of other neurological and psychiatric features, but tremor may be the dominant symptom. It is treatable with copper chelators but can be fatal if left untreated.

Psychogenic (functional) tremor

A functional tremor is the commonest functional movement disorder. A positive diagnosis can be made when the tremor is variable (differs both in amplitude and in frequency when examined). It may also be distractible such that it may subside, alter or stop altogether during a concurrent motor task (distractor) – this is best performed by asking the patients to tap with one hand in time to a rhythm set by the examiner that speeds up and slows down unpredictably, whilst you observe the tremor. Additionally the tremor may adopt the frequency of the rhythm, a phenomenon termed “entrainment”.

An inexplicable inability to perform the task, often with an effortless facial expression, is a common finding in functional tremor.

### Causes of rest tremor

- Idiopathic Parkinson’s disease
- Parkinsonian syndromes
- Multiple system atrophy
- Corticobasal degeneration
- Progressive supranuclear palsy
- Vascular parkinsonism
- Drug-induced dopamine receptor antagonists (e.g. prochlorperazine)
- Dopamine-depleting drugs (e.g. tetrabenazine)
- Sodium valproate
- Lithium
- Amiodarone
- Calcium channel blockers

### Causes of postural tremor

- Enhanced physiologic tremor
- Essential tremor
- Dystonic tremor
- Toxins (e.g. mercury)
- Drugs
- Beta-agonists (e.g. salbutamol)
- Anticonvulsants (especially sodium valproate)
- Thyroxine
- Lithium
- Tricyclic antidepressants
- Caffeine
- Nicotine
- Cocaine
- Amphetamines
- Metabolic disturbance (e.g. hyper thyroidism)
- Neuropathy
- Parkinson’s disease

### Causes of kinetic tremor

- Cerebellar disease (e.g. demyelination, degenerative or secondary to toxins, stroke)
- Holmes tremor
- Wilson’s disease
- Psychogenic (functional) tremor (commonly also present on rest and posture)

### Causes of intention tremor

- Enhanced physiologic tremor
- Essential tremor
- Dystonic tremor
- Parkinson’s disease
- Multiple system atrophy
- Corticobasal degeneration
- Progressive supranuclear palsy
- Vascular parkinsonism
- Drug-induced dopamine receptor antagonists (e.g. prochlorperazine)
- Dopamine-depleting drugs (e.g. tetrabenazine)
- Sodium valproate
- Lithium
- Amiodarone
- Calcium channel blockers

### Causes of physiologic tremor

- Essential tremor
- Enhanced physiologic tremor
- Postural/kinetic tremor
- Intention tremor
- Dystonic tremor
- Wilson’s disease
- Parkinson’s disease
- Multiple system atrophy
- Corticobasal degeneration
- Progressive supranuclear palsy
- Vascular parkinsonism

### Causes of motor tremor

- Essential tremor
- Enhanced physiologic tremor
- Dystonic tremor
- Wilson’s disease
- Parkinson’s disease
- Multiple system atrophy
- Corticobasal degeneration
- Progressive supranuclear palsy
- Vascular parkinsonism
- Drug-induced dopamine receptor antagonists (e.g. prochlorperazine)
- Dopamine-depleting drugs (e.g. tetrabenazine)
- Sodium valproate
- Lithium
- Amiodarone
- Calcium channel blockers
Tremor type | Intervention
--- | ---
Parkinsonian | Levodopa, Amantadine
Drug-induced | Stop offending medication
Postural/intention tremor | Propranolol, Primidone, Clonazepam, Gabapentin, Topiramate
Dystonic tremor | Propranolol, Primidone, Clonazepam, Gabapentin, Topiramate, Baclofen
Other options | Botulinum toxin, Thalamotomy, STN deep brain stimulation

Table 3. Treatment options for tremor

**Treatments**
The treatment of tremor is symptomatic, and patients should be aware that stopping medications that are ineffective would not worsen the underlying condition. Table 3 summarises the principle treatment options for the various tremor types. For PD, the treatment of choice is levodopa, although the tremor in PD can be a difficult symptom to treat. Amantadine may be a useful alternative. For drug-induced tremor, the offending drug should be discontinued, and for metabolic causes, correcting the abnormality should improve the tremor.

A number of medications can be tried for the other causes of tremor, and these should be started at the lowest possible dose and slowly titrated upward to an effective dose if side-effects permit. The response to a medication is highly variable between patients and there will always be a process of trial and error.

Beta-blockers, particularly propranolol, are useful for postural and intention tremors. Primidone is an alternative but its benefit is limited by psychiatric and cognitive side-effects, particularly in the elderly. Clonazepam is a long-acting benzodiazepine that can reduce tremor, but should be started at very low doses to avoid sedation.

Trihexyphenidyl is an anticholinergic medication that has particular effectiveness for dystonic tremor. The main side-effects are dry mouth and confusion, especially in the elderly. Topiramate and gabapentin have also been used in the management of tremor, but are usually ineffective.

Botulinum toxin is licensed for use in focal dystonia and has also shown benefit in head and jaw tremor. Patients with severe refractory tremor may benefit from neurosurgical treatment. Gamma-knife thalamotomy (lesioning of a specific part of the thalamus) and deep brain stimulation of the thalamus can both produce dramatically beneficial effects on tremor in carefully selected patients.

**References**

**Declaration of interests**
None to declare.

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