

How to approach a patient with hand tremor

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Introduction

Tremor is an oscillatory, rhythmic involuntary movement of a body part and is the commonest movement disorder¹⁻⁴. Though this can involve any part of the body, hands are the commonest. Diagnosis is based on history, good observation of the tremor, guided by relevant clinical examination aided by investigations when indicated. This article reviews the tremor classification, associated syndromes and evaluation of a patient.

Classification

Tremors are classified in different ways as it has numerous etiologies and lack of a practical etiological or physiological classification. Therefore the clinical classification still accepted widely as the gold standard¹.

Clinically tremors are mainly classified into rest and action. Latter is further classified into postural, isometric and kinetic tremor where intension tremor is included under kinetic tremor. Rest tremor occurs when the body part is not voluntarily activated and completely supported against gravity (hands rest on the laps). This usually augments with mental stress (counting backwards) and relieves with goal directed movements.

Action tremor is any tremor that is produced by voluntary contraction of muscles. Postural tremor is present while voluntarily maintaining a position against gravity as in extending arms in front of the body. Isometric tremor occurs as a result of muscle contraction against rigid stationary object (squeezing the examiners fingers).

Kinetic tremor occurs during any voluntary movement and is simple when occurs during non-target directed movements (flexion /extension, pronation /supination at wrist) and intension when is target directed as in finger-nose test. Kinetic tremor could be task specific when it appears or augments during specific tasks as in writing.¹⁻⁶

Phenomenology of tremor helps in determining the cause of the tremor, but further clinical evaluation is necessary for determination of different tremor syndromes. Characteristics of different tremors are summarized in table 1.

Type of tremor	Frequency(Hz)	amplitude	occurrence	Associations
Rest	Low to medium (3-6)	High (reduced with target directed movements)	Lib supported against gravity with muscles not activated	Parkinson's Disease ,drug induced
Action	-	-	Voluntary muscle contraction	
Postural	Medium to high (4-12)	low, increases with voluntary movements	Limbs maintains position against gravity	Physiological, essential tremor,thyrotoxicosis,hypoglycemia,alcohol withdrawal and drugs
Simple kinetic	Variable(3-10)	Does not change with target-directed movements.	Simple movements of the limb	Pronation-supintion or flexion extension of wrist
Intention	Low (<5)	Increases with target directed movements	Target directed movements.	Cerebellar lesions (multiple sclerosis, stroke,tumours) drugs, chronic alcoholism
Isometric	Medium	variable	Muscle contraction against stationary object	Holding an object in the hand
Task specific	Variable(4-10)	variable	specific tasks	Primary writing tremor, musician's tremor

Table 1. Characteristics of different tremors

Physiologic tremor

Every normal person exhibits a physiologic tremor, a benign high frequency, low amplitude, postural tremor. This may well be demonstrated when holding a piece of paper on the outstretched hand. Exaggerated physiologic tremor is visible and occurs in the absence of neurological disease¹. When encountered associations such as thyrotoxicosis, hypoglycemia, alcohol withdrawal, use of certain drugs should be excluded. Propranolol may be used for symptomatic relief but alleviation of the cause usually relieves the tremor^{1,2}.

Essential Tremor (ET)

ET is the commonest adult onset movement disorder with a prevalence of 4.1-39.2 cases per 1000 and increasing to 50.5 in elderly, above 60 yrs⁸. It is usually bilateral, largely symmetrical postural or kinetic involving hands and forearms. Other features that help in diagnosis are gradual and yet progressive with increase in amplitude over the time and spread to involve neck and voice in the absence of abnormal posturing (dystonia), acute reduction of tremor amplitude in response to alcohol and familial inheritance.^{1-4,9-12}

If tremor is disabling and embarrassing enough to merit treatment, non-selective beta-blocker, and propranolol is the main stay of treatment. Anti convulsant primidone is equally effective¹¹⁻¹³. In resistant disabling cases Deep Brain Stimulation, a mode of surgical treatment is indicated following thorough assessment.

Dystonic Tremor

This is tremor occurring in the body part affected by dystonia. Dystonic head tremor is classical of this and should be differentiated from tremor associated with dystonia in which tremor occurs in a body part not affected by dystonia.^{1,13,14} Upper limb postural tremor occurring in a cervical dystonia patient is an example that could be difficult to differentiate clinically from ET where electrophysiological studies could be helpful.

Orthostatic tremor is a unique tremor syndrome where sufferers feel unsteadiness during standing causing enormous social embarrassment. Diagnosis should be confirmed by demonstrating a 13-18Hz high frequency tremor on electrophysiological studies.

Parkinsonian Tremor

Parkinson's disease (PD) is relatively less common than ET⁸. About 70000 Australians are suffering from PD (Access Economics). As specific treatment options are available early diagnosis is mandatory. When a patient has any form of pathological tremor together with other diagnostic criteria of PD they are having Parkinsonian tremor syndrome. Tremor may be the presenting feature and when co-existence with one or more typical features of PD diagnosis is most likely. Bradykinesia is a must, whereas rigidity and postural instability are the other main associated features¹⁵⁻¹⁷.

A pure rest tremor with low frequency (4-6 Hz) or rest and postural/kinetic with same frequency is classical of PD. Postural/kinetic with different frequencies which may or may not be associated with rest tremor are also seen¹. At times the tremor may be disabling. The tremor can spread to involve the arm and even the head and face in advanced disease.

Cerebellar tremor

A pure or a dominant intention tremor at a frequency of less than 5 Hz is classical. Tremor should be absent at rest but may be associated with posture. Tremor could either be uni- or bilateral depending on the etiology. Stroke, multiple sclerosis, tumors, drug toxicity are common culprits. It is essential to look into other cerebellar signs as tremor usually occurs in combination in cerebellar lesions¹⁸.

Holmes' tremor

This rare slow tremor is a combination of rest and intention tremor. A postural component is also seen in many patients. This is of central origin associated with lesion in the CNS (mid brain, thalamus)¹⁹.

Drug-induced and Toxic tremor (Table 2)

This is considered as drug-induced if occurs after a reasonable time frame following drug ingestion. Toxic tremor occurs after intoxication¹.

Drug-induced tremors could have the whole spectrum of clinical features of tremor. Common ones are enhanced physiological tremor seen with sympathomimetics and antidepressants and classic Parkinson's tremor associated with neuroleptics and dopamine blocking agents¹. Alcohol withdrawal usually results in enhanced physiological tremor which needs to be differentiated from intention tremor

secondary to cerebellar damage in chronic alcoholism.

Toxic tremors are usually associated with other clinical signs of CNS intoxication such as gaze abnormalities and gait disturbance¹.

Postural	Intension	Rest
Alcohol	Alcohol	Metoclopramide
Amiadarone	Lithium	Neuroleptics
Amphetamines		Reserpine
Beat adrenergic agonists.		
Caffeine		
Cyclosporine		
Dopamine		
Steroids		
Theopylline		
Thyroid hormones		
Try cyclic antidepressants		
Valproic acid		

Table 2. Common causes of drug induced tremor

Tremor syndromes in peripheral neuropathy

Many peripheral neuropathies are associated with tremors which are postural and kinetic predominantly. These peripherally originated tremors are commonly seen with demyelinating neuropathies especially with dysgammaglobulinemias¹.

Psychogenic tremors

This may have different clinical presentations. Sudden onsets and remissions with unusual clinical combinations of tremors should raise the suspicion. Disappearance and change in frequency of tremor when co-activating the antagonistic muscles (resistance to passive movements about a joint) in the tremulous limb is a useful clinical sign to demonstrate (coactivation sign).²⁰ Distraction reduces the amplitude together with variation of tremor frequency. Past history of somatization and appearance of additional and unrelated neurological signs are additional evidence¹.

Evaluation of a tremor patient

Nothing can be substituted for a good history in evaluating a patient with tremor. Onset, relieving and exacerbating factors, family history and recent medications are essentials. The initial assessment should also include functional limitations mainly

activities of daily living, occupation, social and recreational activities.

Good clinical observation is the most important aspect of physical examination, and should aim at demonstrating various aspects of tremor phenomenology described earlier. Arms resting on the laps, extending in front of the body, finger-nose test are some essential maneuvers and holding a cup, drawing a spiral are also useful in diagnosis as well in determining functional limitations.

Physician should be able to describe tremor as to involve body part (arms, head and neck), activation condition (when it is actually present or get worse), frequency (fast or slow) and amplitude (fine or coarse).

When encountered with a rest tremor it is essential to check for associated rigidity and bradykinesia. Both the tremor and rigidity get worse when performing voluntary movements from opposite limb. Gait is an essential part of assement which could demonstrate difficulty in initiation, reduced arm swinging and freezing. If PD is suspected a trial of levodopa is appropriate and referral to a neurologist is important if features are atypical or failure to respond to medication.

In assessing Patients with intension tremor, associated symptoms like imbalance, dizziness, dysarthria and ataxia should be inquired and looked

into. Stroke result in acute onset symptoms where as multiple sclerosis demonstrate relapsing nature together with visual disturbance and diverse neurological features. Chronic alcoholism is an important cause that needs to exclude with relevant examination and relevant blood tests.

Thyrotoxicosis is a common presentation of postural tremor which needs exclusion by relevant clinical examination (rapid pulse, eye signs, and goiter) and arranging a thyroid profile. Anxiety and panic attacks are commonly associated with postural tremors and relevant features such as palpitation, chest discomfort and feeling of suffocation should be looked especially in young. Medication over use and withdrawal is an important cause that should look in postural tremors. Essential tremors should be suspected once the clinical examination is otherwise normal especially with a positive family history.

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Investigating a tremor patient

Diagnosis of tremor is usually clinical but can be supported by electrophysiological studies mainly surface electromyography, accelerometers, handwriting tremor analysis. An EMG assessment of the tremor is the most reliable method of diagnosing primary orthostatic tremor. This can also be useful in diagnosing dystonic tremor and assessing the frequency which help in differentiating difficult tremors. Though not routinely used several rating scales are available for assessing various aspects of tremor syndromes.^{1,21}

Routine and specific investigations should be ordered depending on the clinical suspicion of etiology of tremor. e.g. thyroid function tests in exaggerated physiological tremor

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