

Research

Clinical Brief: Classification of Essential and Parkinson's Tremors

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Abstract

Essential tremor and Parkinson's disease are the most common tremors encountered in clinical practice. In addition to the detailed history, the differential diagnosis is mainly clinical and does not typically require use of special tests. In these cases, the role of the chiropractic physician and manual therapist should be to provide early diagnosis, appropriate referral, and provide palliative care aimed at improved patient function and quality of life.

Introduction

Essential tremor (ET) and the tremor of Parkinson's disease (PD) are the most common tremors encountered in clinical practice.¹ A tremor is defined as an involuntary, rhythmic, and roughly sinusoidal movement of one or more body parts.¹ The underlying cause and classification of tremor can usually be determined based on history and observation and aided by investigations when indicated.²

The first step in evaluating any patient with tremor is to characterize the tremor. Various types of tremor can be distinguished clinically based on the activation condition, frequency and anatomical distribution. The most useful and accepted classification divides tremor according to its behaviors—rest or action. The action tremor can be further subdivided into postural and kinetic tremor (**Table 1**).^{1,3,4,5} Clinical classification is accepted widely as the gold standard, so special investigations are usually not required for accurate diagnosis.³

Table 1. Classification of tremor. ^{1,3,4,5}

Type of tremor	Definition
Rest tremor	Tremor that occurs in a body part that is not voluntarily activated and is completely supported against gravity
Action tremor	Any tremor that is produced by voluntary contraction of muscle, including postural, isometric, and kinetic tremor.
Postural tremor	Tremor that is present while voluntarily maintaining a position against gravity
Kinetic tremor	Tremor that occurs during any voluntary movement. It may include visually or non-visually guided movements. Tremor during target directed movement is called intention tremor.
Isometric tremor	Tremor that occurs as a result of muscle contraction against a rigid stationary object.
Task specific tremor	Kinetic tremor that may appear or become exacerbated during specific activities (holding a cup, handwriting)

Action tremor, the most prevalent of these types of tremor, occurs during sustained extension of the arm and during voluntary movements, such as writing or typing. Resting tremor occurs with the patient sitting his arms firmly supported without any voluntary activities and commonly increases with mental stress.¹

The most common cause of resting tremor is idiopathic Parkinson's disease, while the most common cause of postural and kinetic tremor is essential tremor.¹ On an etiological level, ET is often considered to be genetic.^{6,7} Most studies indicate that it is a familial disorder in 50-70% of patients and the frequency of family history is inversely proportional to the age at onset.^{8,9}

The upper limbs are affected in about 95% of tremor patients, followed by head (34%), lower limbs (20%), voice (12%), face and trunk (5%).⁴ The prevalence ranges from 0.4% to 6.7% in persons over 40 years of age, making ET the most common type of tremor.^{10,11,12} Its prevalence increases in the elderly and may be as high as 14% in people over 65 years.¹³ Several studies have shown that ET is as much as 20 times more prevalent than PD tremor.^{14,15} Overall, the age- and gender-adjusted incidence rate for PD is 13.4 per 100,000.¹⁶ The tremor in PD commonly occurs at rest and becomes less prominent with voluntary movement. It typically occurs initially in the distal upper extremity, and over time, moves proximally and then to the other upper extremity, again in a distal to proximal pattern. An estimated 70% of patients with PD present with tremor.¹

Clinical Diagnosis

A thorough history is essential when evaluating a patient with tremor. Onset, relieving and exacerbating factors, family history, and recent medications are vital. The initial assessment should include functional limitations caused by a tremor, including during activities of daily living, occupation, and social and recreational activities. A positive family history and acute reduction of tremor amplitude in response to alcohol is typical in essential tremor.^{2,3}

The physician should be able to describe tremor in terms of:

- Body parts involved (arms, head, neck, etc)
- Activation condition (when present)
- Frequency (fast >6 Hz, slow <6 Hz)
- Regularity (regular or jerky)
- Amplitude (fine or coarse)

First observe the patient sitting at rest to note whether there is evidence of a resting tremor of the head, hands or legs. Then, ask the patient to stretch arms and hands completely and look for postural tremor, followed by checking finger-nose-finger movements looking for kinetic tremor. Typically, essential tremor is an action tremor, either postural or kinetic in character, mainly affecting the hands. Functional tests, such as observing handwriting, holding a cup and inducing mental stress, should be incorporated as they may be useful in tremor classification. Patients with ET will typically have a large and tremulous handwriting style; whereas patients with PD will write small and illegibly.¹ As rest tremor typically augments with mental stress, having the patient count backwards can help to bring out a tremor.²

When suspecting a rest tremor it is necessary to check for associated rigidity and bradykinesia, suggesting PD. Both tremor and rigidity may get worse when performing voluntary movements with the opposite limb. Gait is a critical part of assessment, which can demonstrate difficulty in gait initiation, reduced arm swinging and freezing. If PD is suspected, referral to a neurologist is appropriate.²

While clinically differentiating between ET and tremor of PD can be challenging, there are many features that can assist in distinguishing between the two (**Table 2**). Features supporting tremor of PD include asymmetric onset, occurring at rest, or while walking. In addition, patients with ET typically lack extrapyramidal signs, including bradykinesia, postural instability and/or rigidity. Most patients with ET do not have any abnormal neurological findings.¹⁷ Fifty percent of ET patients positively respond to small amounts of alcohol, however only temporarily.¹⁸

Table 2- Features differentiating tremor of Parkinson's disease (PD) from essential tremor (ET).¹

Features	Parkinson's tremor	Essential tremor
Tremor	At rest, increases with walking. Decreases with posture holding or action	Posture holding or action
Frequency	3-6 Hz	5-12 Hz
Distribution	Asymmetrical	Symmetrical (mostly)
Body parts	Hands and legs	Hands, head, voice
Writing	Small and Illegible	Tremulous
Course	Progressive	Stable or slowly progressive
Family History	Less common (1%)	Often (30%-50%)
Other neurological signs	Bradykinesia, rigidity, loss of postural reflexes	None
Substances that improve tremor	Levodopa, anticholinergics	Alcohol, propranolol, primidone
Surgical treatment	Patients usually have other Parkinsonian features requiring subthalamic nucleus or internal globus pallidus deep brain stimulation (DBS)	Thalamic VIM DBS or thalamotomy

Patients with action tremor should be regularly screened for thyroid, renal and liver function. Other specific investigations should be ordered depending on the clinical suspicion of tremor etiology. Other potential causes of tremor that should be assessed in the differential include stroke, multiple sclerosis, chronic alcoholism, and drug reactions. These prescription drugs are capable of producing action tremors: β -adrenergic agonists, valproic acid, thyroxin, tricyclic antidepressants, selective serotonin reuptake inhibitors (SSRIs), and lithium.¹

Pharmaceutical Management

If the tremor of ET is disabling enough to warrant treatment, the non-selective beta blocker propranolol is the mainstay of treatment. Additionally the anti-convulsive medication primidone is equally effective; however severe side effects such as nausea and extreme fatigue may occur. In general, 50%-70% of patients obtain symptomatic relief from propranolol, but dramatic improvement occurs in a much smaller percentage.¹

The tremor of PD usually improves with antiparksonian medications, including levodopa, dopamine agonists, anticholinergics and amantadine. The presence of severe tremor not improved with medications may be an indication for deep brain stimulation therapy.²

Spinal Manipulation

The scientific literature provides only anecdotal evidence supporting spinal manipulation for management of tremors. A case report describing chiropractic care with upper cervical manipulation reported improved quality of sleep, perceived energy, balance, agility, decreased rigidity and improved a number of activities of daily living for a PD patient.¹⁹ However, controlled studies are necessary to establish any potential benefits of spinal manipulation for tremor patients, as no conclusions can be drawn at this time. Currently, the role of the chiropractic physician and other manual therapists who do not prescribe medications should be to provide early diagnosis, appropriate referral, and provide palliative care aimed at improved patient function and quality of life (**Table 3**).²⁰

Table 3. Principles of PD Treatment²⁰

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- Early specialist referral
 - Control of symptoms via medication
 - Regular multi-disciplinary assessment and a wide range of therapy
 - Management of non-motor symptoms
 - Education and information for practical health and support
 - Consideration of the needs of the palliative patient
 - Support and involvement of family care-givers
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Conclusions

With as much as 14% of the population suffering from tremors, particularly in elderly patients, there is a high likelihood that manual therapy providers will see these patients in clinical practice. A thorough history and clinical exam should be used to classify the tremor and attempt to distinguish between ET and PD. Suspected PD requires early medical referral and multi-disciplinary cooperation for diagnosis and treatment. Manual treatment should be aimed at providing palliative support and improving patient quality of life.

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