

Historical and Clinical Features of Psychogenic Tremor: a Review of 70 Cases

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ABSTRACT: Objectives: To review the clinical characteristics and associated features found in patients with psychogenic tremor. **Methods:** Ten-year retrospective review of charts of all patients and video-tapes of fifty-one patients diagnosed by the senior author as having psychogenic tremor. **Results:** Seventy patients fulfilled the diagnostic criteria for clinically definite psychogenic tremors. Psychogenic tremors usually started abruptly (73%), often with the maximal disability at onset (46%), and then took static (46%) or fluctuating (17%) courses. Psychogenic tremors usually started in one limb and spread rapidly to a generalized or mixed distribution. Spontaneous resolution and recurrence, easy distractibility together with entrainment and response to suggestion were characteristic features. Presence of functional symptoms and signs and refractoriness to conventional antitremor drugs were common. **Conclusions:** Psychogenic tremor is generally not a diagnosis of exclusion. The presence of characteristic features on history and especially clinical examination can permit an accurate diagnosis and avoid unnecessary investigations.

RÉSUMÉ: Caractéristiques historiques et cliniques du tremblement psychogène: revue de 70 cas. Objectifs: Nous revoyons les caractéristiques cliniques et les manifestations associées observées chez les patients atteints de tremblement psychogène. **Méthodes:** Nous avons procédé à une revue rétrospective des dossiers de tous les patients et aux enregistrements vidéo de cinquante et un patients chez qui l'auteur senior a posé un diagnostic de tremblement psychogène. **Résultats:** Les critères diagnostiques cliniques du tremblement psychogène étaient présents chez soixante-dix patients. Le tremblement psychogène commençait habituellement abruptement (73%), donnant lieu souvent à une invalidité maximale au début (46%) avec une évolution stable (46%) ou fluctuante (17%). Les tremblements psychogènes commençaient habituellement dans un membre et se propageaient rapidement en une distribution généralisée ou mixte. La résolution spontanée et la récurrence, la distractibilité ainsi que l'entraînement et la réponse à la suggestion étaient des manifestations caractéristiques. La présence de symptômes et de signes fonctionnels et le fait que le tremblement soit réfractaire aux médicaments antitremblement étaient fréquents. **Conclusions:** Le tremblement psychogène n'est généralement pas un diagnostic d'exclusion. La présence de manifestations caractéristiques à l'histoire et surtout à l'examen clinique peut permettre un diagnostic exact et éviter des investigations inutiles.

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Since the seminal report of Fahn and Williams describing psychogenic dystonia,¹ a number of articles about psychogenic movement disorders² including dystonia,³ tremor⁴⁻⁶ myoclonus,⁷ tics,^{8,9} and parkinsonism¹⁰ have been reported. Because of their unusual clinical presentation, difficulty in confirming the diagnosis, refractoriness to conventional pharmacological treatment and often protracted course, psychogenic movement disorders have been recognized as an important problem in the field of movement disorders. Psychogenic movement disorders have often been considered diagnoses of exclusion.^{1,3} However, recent studies in this field have emphasized certain clinical factors which can allow a definitive diagnosis in many cases without undertaking the extensive investigations necessary to exclude all possible "organic" differential diagnoses.¹¹ In addition, certain specific diagnostic tools may help in differentiating between

organic and psychogenic movement disorders in select difficult cases.^{6,10,12}

Despite the frequency of organic tremors, our understanding of their pathophysiologies is rather limited and routine investigations are often unrevealing. This lack of definite diagnostic markers contributes to the difficulty that physicians may experience in differentiating between organic and psychogenic tremors. We reviewed a large series of patients with a diagnosis of clinically definite¹³ psychogenic tremor to enhance the understanding

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of the clinical characteristics and assist in correctly differentiating psychogenic from organic tremors.

METHODS

Charts and videotapes of patients seen by the senior author (A.E.L.) at The Toronto Hospital Movement Disorders Center and diagnosed as having psychogenic tremor between 1988 and 1997 were reviewed. Where appropriate, major causes of symptomatic tremors were excluded by laboratory tests such as thyroid function tests, serum copper and ceruloplasmin levels and other metabolic screening and by a history of use of medication known to cause tremor. Essential tremor and Parkinson's disease were excluded by clinical criteria.^{14,15}

Originally Fahn and Williams categorized patients with psychogenic movements into four groups of diagnostic certainty ("documented", "clinically established", "probable" and "possible"). To be documented, the symptoms had to have been relieved by psychotherapy, suggestion or by placebo or the patient was witnessed to be free of symptoms when left alone, supposedly unobserved. To be clinically established, the movements were inconsistent over time or were incongruent with organic tremors and any of the following were present: other definite psychogenic neurologic signs, multiple somatizations and an obvious psychiatric disturbance. Later they proposed that these two categories, which both imply a definite diagnosis, could be merged into the single category of "clinically definite".¹³ We included only those patients fulfilling criteria for clinically definite psychogenic tremor in the review. Since most were not followed for prolonged periods and placebo was administered inconsistently in only rare cases in the early years of series, most patients fulfilled criteria for "clinically established" psychogenic tremor outlined in Fahn and Williams' original classification scheme.

Data obtained from this retrospective chart survey included demographics of the psychogenic tremor population, the occurrence of precipitating factors, the nature of symptom onset and temporal profile, the location of onset and final distribution of tremor, characteristics of tremor on neurologic examination, presence of other psychogenic movement disorders and other functional neurologic symptoms and signs and the presence of underlying psychopathology. Of these features, three specific characteristics on examination, complete distractibility, entrainment and marked variability in frequency and direction had been used independently in initially categorizing the diagnosis as "clinically definite" psychogenic tremor (i.e., incongruency with organic tremors). Each of these features did not have to be present for such a diagnosis and were not always present together in the same patient.

RESULTS

Seventy patients (46 females and 24 males) fulfilled the diagnostic criteria for clinically definite psychogenic tremor. The mean age was 41 ± 13.7 (range 11 - 63) years and the mean age of onset was 36.1 ± 13.8 (range 10 - 63) years. The mean duration of illness was 49.4 ± 65 (range 0.03-240) months.

Precipitants occurring before the onset of psychogenic tremor were identified in thirty-six patients (51%). Physical injury was most common (23 patients) including motor vehicle accidents

(10 patients), head injury (5 patients), neck injury (4 patients), limb injury (5 patients) and back injury (1 patient). Of ten patients who had motor vehicle accidents 2 patients had neck injury. The other identified precipitants were psychological insult in 6 patients, flu-like illness in 5 patients, and surgery and acute pain of uncertain etiology in one patient each, respectively. In fifty-one patients (73%) onset of tremor was abrupt and in nine (13%) insidious. In ten patients, we could not identify the exact mode of onset from the medical records. The latencies from onset to maximal disability were identified in 35 patients. In 16 (46%) out of 35 patients, tremors were maximal from the onset, whereas in 19 (54%), there was a delay to maximal disability which ranged from several days to years. Clinical course after maximal disability was static in 32 patients (46%), progressively worsening in 15 patients (21%), fluctuating in 12 patients (17%), improved in 3 patients (4%) and uncertain in 8 (11%). We identified new recurrences after a remission of previous symptoms in four patients (all classified in the group with fluctuating symptoms), three by history and one by our observation during follow-up. Spontaneous remission occurred in 10 patients (nine on history and one during follow-up); partial in six and complete in four.

Table 1 summarizes the location of onset and the final distribution of tremor at the time of clinical evaluation. Sites of onset and final distribution were defined as follows: focal - single focal site; segmental - two or more contiguous sites; unilateral - arm and leg on same side; bilateral - arms or legs without involvement of intervening contiguous sites (i.e., axial structures); generalized - bilateral limbs (arms or legs) plus other sites (i.e., other limbs, axial structures). Where the information was available, focal or segmental onset (53 patients) was more common than

Table 1: Distribution of psychogenic tremor (N = 70).

Focal or segmental onset	53
tremor confined to region of onset	15
head & neck	5
one limb	10
tremor spread to adjacent areas	19
face to mixed	2
head to axial and/or limbs	4
one limb: to other ipsilateral limb	4
to unusual pattern (mixed)	6
to axial	3
tremor later generalized	14
onset: from one limb	11
from unilateral arm and leg	3
tremor migrated - original site remitted	2
uncertain final distribution	3
onset: from one limb	2
from unilateral arm and leg	1
Bilateral (arms or legs) onset	5
tremor confined to region of onset (arms: legs = 1:1)	2
tremor later generalized	3
Generalized onset	5
persistent generalized tremor	4
uncertain final distribution	1
Uncertain onset	7
later generalized	1
uncertain final distribution	6

bilateral (5 patients) or generalized onset (5 patients). In 50 of 53 patients with focal or segmental onset where information about the final distribution was available, tremors remained confined to the region of onset in 15 (30%), spread to adjacent areas in 19 (38%), and became generalized (i.e., involving all limbs and mixed muscles) in 14 (28%). In patients who showed focal or segmental onset and later generalized, latency from onset of tremor to generalization varied from several minutes to years. In the 18 of 24 patients with generalized involvement at the time of review where a history of the nature of the onset was available, this distribution was evident within several days of onset of tremor in 13 (72%). In two patients, tremor migrated to another area and involvement of the original site remitted. As far as a final distribution, generalized tremor was most common (31%). However, only 4 of 22 patients with generalized tremor had generalized onset of tremor. In 38 patients, tremor began in one limb (arm = 31, leg = 7); in those with onset in the arm, the dominant side was involved in 74% (23/31).

Various factors were associated with improvement or aggravation of psychogenic tremors on history in 20 and 24 patients respectively. Factors resulting in improvements were physical restraint, rest or relaxation, mental concentration, insertion of an EMG needle at the time the patient underwent clinical electrophysiological studies, and adopting a specific posture such as lying down, walking or sitting upright. Tremor was partially improved by alcohol in only one patient. Factors described as aggravating the tremors were stress, fatigue or exertion, activity, specific postures, sudden loud noise, staring at an object, fluorescent light and cold air. Tremors could be voluntarily induced in five patients or suppressed in three patients.

In analysis of videotapes of 51 patients, 32(63%) had tremor at rest; 6(12%) isolated and 26(51%) with variable combinations of postural and/or action tremor (17(33%) had all 3 components). Nineteen (37%) had no resting components of tremor. Variability of tremor in terms of frequency, direction, amplitude or involved sites was extremely common (88%) (Table 2). Distractibility with disappearance or marked suppression of tremor when the patient concentrated on other motor or mental tasks was present in 80% of patients. Entrainment, which refers to a change of the original tremor frequency to match the frequency of a requested repetitive task in another limb or side to side tongue movements, was obvious in 49%. A mixture of complete suppression with distraction and entrainment was often seen. At times, these features were evident when the requested repetitive movement (e.g., tapping thumb to index finger) was very slow and distinct from the psychogenic tremor frequency whereas they were less likely

when the repetitive movement was faster and closer to the frequency of the psychogenic tremor. In the infrequent situation where the tremor continued unabated, it was common to find that the speed, and rhythmicity of the other requested movement (e.g., moving the tongue rapidly from side to side, rapid tapping of the opposite hand) suffered and was performed irregularly and incompletely. Seventeen patients (33%) responded to suggestion which either suppressed or induced tremors. Depending on duration of the tremor seen on videotape, we grouped cases into three categories: 1) long duration which was either continuous or intermittent, 2) short lived paroxysmal tremors lasting less than 30 seconds and 3) continuous tremors with superimposed short paroxysmal episodes (Table 2). In those patients who had continuous or intermittent but long episodes of tremor, psychogenic tremors were highly distractible (93%) although they tended to respond less to suggestion. Short lived paroxysmal psychogenic tremors were more suggestible than other groups.

Additional psychogenic movement disorders were present in 27 patients (39%) and seven of them had more than one type of psychogenic movement disorder. In all of these patients, tremor was the predominant movement disorder. Among them, psychogenic myoclonus was most common (13 patients); dystonia and parkinsonism were present in 11 and two patients respectively. In six patients, the movements were so unusual and bizarre that they could not be classified into a currently recognized type of movement disorder. Twelve of seventy psychogenic tremor patients (17%) had coexisting organic movement disorders which were essential tremor in seven patients (definite in three and possible in four), dystonia in two patients, tardive dyskinesia in one patient, parkinsonism in one patient and benign fasciculations in one patient.

Table 3 outlines other functional features and litigation/compensation factors. Functional symptoms such as multiple somatic complaints, pain, dizziness, unsteadiness, insomnia, numbness or headache without obvious cause or signs were identified in 55 (79%) patients. Antalgic gait (16 patients) and give way weakness (13 patients) were common signs. Selective disability was present in 24 (34%) patients. By this we mean that the tremor substantially interfered with selective activities leaving others relatively unaffected despite features on examination that would have predicted non-selective disabilities (i.e., not a task specific tremor). Compensation or litigation was pending in 21 (30%) patients. Four patients had no additional functional features or compensation issues. Thirty-six (51%) patients were thought to have overt psychopathology which was assessed formally by a psychiatrist in 19 patients or informally by us. Depression was

Table 2: Review of videotapes of 51 cases of psychogenic tremor.

	Distractibility	Entrainment	Variability	Suggestion
Continuous or intermittent, long duration (40)	37 (93%)	24 (60%)	38 (95%)	10 (25%)
Continuous with superimposed short paroxysms (4)	3 (75%)	1 (25%)	3 (75%)	2 (50%)
Short lived, paroxysmal (7)	1 (14%)	0 (0%)	4 (57%)	5 (71%)
Total (n = 51)	41 (80%)	25 (49%)	45 (88%)	17 (33%)

Table 3: Functional features / compensation or litigation (N = 70).

• Symptom*		39
• Sign		30
	bizarre gait with antalgic components	16
	give-way weakness	13
	abnormal sensory exam	8
	slowness of movement	2
	pseudoseizure	2
	amnesia	1
• Selective disability		24
• Compensation or litigation		21
• Overt secondary gain		1

* multiple somatic complaints, pain without obvious cause or psychogenic pain syndrome, insomnia, dizziness, unsteadiness.

the primary psychiatric diagnosis (Axis I) in the majority (19 patients). Others included conversion disorders in three patients, somatoform disorders in two patients, and post traumatic stress disorder, chronic fatigue syndrome and schizophrenia in one patient each. In nine patients, psychiatric evaluations were pending without a definite diagnosis.

Only 10 patients were followed up and the mean duration of follow-up was 19.4 ± 2.5 months. Only one of these patients had improved. Five were unchanged, three had worsened and one had remitted and then relapsed. Eighteen patients were identified to have tried more than one anti-tremor drug before visiting us and only one patient reported a partial responsiveness to medication.

DISCUSSION

This is the largest series of patients with psychogenic tremor reported to date. Most of the clinical characteristics such as mode of onset and clinical course, precipitants, occurrence of spontaneous resolution, and combined functional features or psychiatric illness were generally similar to the previous reports.^{2,4,6} Abrupt or acute onset occurred in 3/4 of our patients and between 43% and 92% in other series. Insidious onset of tremor has not been emphasized in previous reports while it occurred in 13% of our cases. Previous reports usually have described static or fluctuating courses after onset in most cases of psychogenic tremor. In 21% of our patients, however, tremors worsened progressively compared to 4% in the only other series to mention this.⁴ Psychogenic tremors started from a focal or regional area in 76% of patients and then spread to an adjacent area, became generalized or remained confined to the region of onset in that order of frequency. Seventy-two percent of those progressing to generalized involvement did so rapidly, over several days. Generalized onset occurred in only 5 of 63 patients for whom this information was available. Generalized tremor was the most common final distribution (31%). Involvement of a single limb was seen in 17% cases. In summary, the commonest anatomical and temporal profile was a tremor that began abruptly in a focal or regional area and rapidly progressed to involve the whole body or show a mixed, unusual distribution. Spontaneous remission of tremor at the site of onset with subsequent new occurrence in another area was seen in two patients.

Though variability was the most common feature in our series, distractibility is probably evident more often in cases of

psychogenic tremor than in other forms of psychogenic movement disorders. We identified distractibility in 80% of patients on examination, a figure somewhat lower than in other studies (86-95%), and entrainment and response to suggestion in 49% and 33% respectively. These figures may be influenced by the fact that distractibility and entrainment were clinical features used to support the original diagnosis of psychogenic tremor. However, they were not mandatory components and were never the sole diagnostic feature. The true proportions of cases with these features may be lower than our findings however, confirming the diagnosis in patients without using these clinical features could be quite problematic. Recently Deuschl et al.⁶ emphasized the occurrence of co-activation of agonist and antagonist muscles in psychogenic tremor which they identified by clinical examination and EMG. This "co-activation sign" is appreciated clinically as a cogwheel-like resistance to passive movement which subsides completely (sometimes for only brief periods) if the patient can be made to relax completely. They also emphasized the increase in amplitude of psychogenic tremor when a limb is weighted. In difficult or questionable cases, electrophysiological evaluation of these features as well as frequency analysis with additional evaluation for entrainment may help confirm or refute¹⁶ a diagnosis of psychogenic tremor.

One should be cautious in differentiating certain organic tremors with unusual clinical features from psychogenic tremor. Some features such as abrupt onset, presence in all positions, selective disabilities, variability and suggestibility can be seen in organic tremors as well. Table 4 provides a listing of possible sources of diagnostic confusion and the clinical features which are useful in differentiating psychogenic tremor from these other diagnostic possibilities. Caution should also be exercised in considering the role of peripheral injury and pending litigation, especially given the increasing recognition of the potential for peripheral injury to induce organic movement disorders.¹⁷ However, all patients in this series fulfilled criteria for clinically definite psychogenic tremor emphasizing that this diagnosis must be carefully considered in cases where peripheral injury has been presumed to cause an unusual tremor.

As in other series of psychogenic movement disorders,^{2,6} cases of psychogenic tremor that reach the attention of a specialty movement disorders clinic may have a protracted course and an uncertain or poor prognosis. We observed recurrence of psychogenic tremor in one of ten patients during the follow-up period and in three patients by history. In only 1 of the 10 patients followed had psychogenic tremor improved. Deuschl et al.⁶ recently reported that resolution occurred in only 38% of sixteen patients followed up over a mean of 60 months and 56% of these had recurrences of symptoms which were usually caused by defined precipitants. Those with persistent psychogenic tremors often experienced substantial long-term disabilities. Once the diagnosis is established after careful evaluation (sometimes requiring several examinations over an extended period with additional electrophysiological studies in questionable or difficult cases), additional and repeated investigations are not warranted even when symptoms persist and disability is profound. In a recent six-year follow-up survey of patients with "medically unexplained motor symptoms" (12 of 38 with abnormal motor activity had tremor), Crimlisk et al.¹⁸ found that once a diagnosis of a "non-organic" source was made on the basis of appropriate

Table 4: Differential diagnostic features between organic and psychogenic tremors.

Clinical Feature	Examples of Organic Tremors Sometimes Demonstrating the Clinical Features	Characteristics of Psychogenic Tremor / Differentiation from Organic Tremors
Abrupt onset	Wilson's disease Strokes Parkinson's disease (often precipitated by stress) Intoxications / Drugs	Maximum severity often immediately or soon after onset
Tremor present at rest, with postural maintenance and action	Cerebellar outflow tremor (rest < posture < action) Severe essential tremor (rest < posture < action) Parkinson's disease (rest ≥ posture > action)	Often maintains the same amplitudes in all 3 states (i.e., rest = posture = action)
Selective disability	Task specific tremor (e.g., primary writing tremor)	Rarely tremor exclusive to one activity. More often the opposite is seen, i.e., some activities are possible that the nature and severity of the tremor should have precluded.
Entrainment	Mirror movements (often seen in Parkinson's disease)	Entrainment (i.e., new frequency) should eliminate or completely replace original frequency (may need electrophysiology to demonstrate (15))
Distractibility	Rare; e.g., putamen lesion (15)	Should be a repeated and consistent feature before accepting
Co-activation sign (6)	Could be confused with cogwheel rigidity	Resistance abruptly abates (sometimes only briefly) if a patient can be made to relax or is distracted; distraction maneuver such as movement of the opposite limb should increase organic rigidity.
Suggestibility / Increase with attention	Not uncommon especially in organic tremors with some "functional" overlay	Common; should not be used as exclusive clinical support for the diagnosis.

clinical assessment and investigations, a new organic neurologic diagnosis was made subsequently in only three of 64 patients. They emphasized, and we concur from our experience with these patients and a large number of other psychogenic movement disorders,^{3,10,11} that reinvestigation should be avoided unless a clear indication exists since it is expensive and potentially harmful.

In conclusion, several features of psychogenic tremor are characteristic and distinct from organic tremor disorders. These include certain historical features, such as abrupt onset and rapid evolution and spontaneous remission with later relapses in another site, and clinical features such as distractibility, entrainment, and the "co-activation sign" identified on clinical examination and EMG assessment. Thus, psychogenic tremor is not solely a diagnosis of exclusion. However, diagnosis may be difficult, requiring extended or repeated observations, especially if an associated organic movement disorder is present. A long history of tremor is not incompatible with the diagnosis of psychogenic tremor and prognosis for prolonged or persistent resolution of symptoms may be poor.

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