

Case Reports

Unusual Wrist Tremor: Unilateral Isometric Tremor?

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Abstract

Background: Tremors may be difficult to classify.

Case Report: An 83-year-old male presented with an unusual left wrist tremor. The tremor could be reproducibly elicited by making a fist or carrying a weighted object (e.g., a shopping bag, bottle of water) of approximately 1 lb or more, and it intensified with heavier weights. The tremor was difficult to classify, although it shared features with isometric tremor.

Discussion: This specific presentation of tremor has not been reported previously. We hope that the detailed description we provide will aid other neurologists who encounter this or similar tremors in their clinics.

Keywords: Tremor, isometric tremor

Citation: Zesiewicz T, Vu T, Carranza MA, et al. Unusual wrist tremor: unilateral isometric tremor? Tremor Other Hyperkinet Mov. 2014; 4: <http://tremorjournal.org/article/view/194>

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Editor: Julian Benito-Leon, Hospital "12 de Octubre", Madrid, Spain

Received: July 9, 2013 **Accepted:** November 14, 2013 **Published:** January 8, 2014

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Funding: None.

Financial Disclosures: Theresa Zesiewicz has received consulting fees from TEVA, GE Healthcare, and UCB Pharma, research grant support from Astellas Pharmaceuticals, Friedreich's Ataxia Research Alliance, Edison Pharmaceuticals, Takeda, GlaxoSmithKline, and Baxter Pharmaceuticals. Tuan Vu has presented speaker programs for Allergan Pharmaceuticals. Dr. Elan Louis is supported by NIH and the PDF.

Conflict of Interest: The authors report no conflict of interest.

Introduction

Tremor has been defined as an involuntary, rhythmical, and symmetrical movement about an axis of equilibrium.¹ It is generally classified according to whether it occurs at rest or with action. Action tremor is further divided into "postural" tremor, which occurs when the limbs are held against gravity, and "kinetic" tremor, which appears during voluntary movement.² We describe a patient whose tremor was produced by holding a weight of at least (0.45 kg), or by making a very tight fist. Clinically, the tremor appears to be most similar to isometric tremor.

Case report

An 83-year-old right-handed percussionist presented with a 3-year history of left wrist tremor that occurred when engaged in weight-bearing tasks requiring him to grasp heavy objects. He had first noticed the tremor

while walking home carrying a (2.27 kg) shopping bag in his left hand. According to the patient, the tremor did not occur at rest or with arm extension, but only when carrying a heavy object in his left hand. The severity of the tremor ranged from moderate to marked. Manipulative action (i.e., change in wrist posture) did not alleviate the tremor once it had occurred. He reported no difficulty or tremor with other activities, such as pouring liquid from a container, brushing his teeth, combing his hair, eating with utensils brought up to his mouth, writing or drawing with his right hand, or with any other activity that required both hands. The patient had been a percussionist for 70 years, but he did not experience tremor when he played the drums, or abnormal posturing in his left hand or tremor at rest.

His past medical history was unremarkable except for a mild left ulnar nerve compression neuropathy that was evident on electromyography (EMG) approximately 1 year prior to his presentation at our movement



Video 1. Subject sitting with left arm at rest, no tremor noted.



Video 4. Subject with arms outstretched, no tremor noted in either hand.



Video 2. Subject standing with left arm at rest, no tremor noted.



Video 5. When making a fist with arms outstretched, tremor noted in left hand only.

disorders clinic; the test had been performed as part of his work-up for tremor. There was no history of trauma to his left hand, arm, neck, or head and there was no family history of tremor. Ethanol use did not suppress the tremor. The patient had been treated with primidone (100 mg b.i.d.), propranolol (dose unknown), carbidopa/levodopa (25/100 q.i.d.), and clonazepam (0.5 mg b.i.d.), each as monotherapy, for several months at a time, without efficacy. He had not received a formal diagnosis for his movement disorder prior to seeing us.

The patient was examined by two of the authors (T.A.Z., T.V.) at the University of South Florida. The tremor in the patient's left hand was provoked after asking him to hold a bag or a bottle of water that weighed approximately (0.45 kg). His hands were kept in a relaxed position at his side while standing, prior to holding the weighted bag. Upon picking up the bag with his left hand, his left arm demonstrated a tremor of moderate amplitude, particularly in his wrist, which caused rhythmic shaking of his entire left arm from the wrist to the shoulder.



Video 3. Subject is instructed to make a fist with his left hand while standing, and low amplitude tremor noted.



Video 6. Subject holds a 1 lb (0.45 kg) weight in left hand while sitting, and low amplitude tremor is noted.



Video 7. Subject notes a 10 lb (4.54 kg) weight while sitting, producing higher amplitude tremor.

A tremor was not produced in the right arm or either leg during extension. The patient could re-elicite the left-handed tremor when making a fist with his left hand, although not with his right hand. No tremor was noted when he held the shopping bag in his right hand. No rest tremor was observed while the patient was seated or when lying down. There was no head, voice, or postural tremor, but a mild kinetic tremor in his arms was observed. No tremor could be elicited when writing with either hand.

His general physical examination and vital signs were unremarkable. No abnormalities were noted on the following examinations: Folstein Mini Mental State Examination,³ cranial nerve examination, motor or sensory examinations, and examination of deep tendon reflexes, coordination, and cerebellar function. There were no signs of left ulnar neuropathy, and no weakness, atrophy of muscles, or sensory loss in the ulnar nerve territory. Neither dystonia nor signs of parkinsonism were present, including hypophonia, hypomimia, rigidity, bradykinesia, or abnormalities in leg agility, finger taps, or rapid alternating movements. Gait was normal, with normal bilateral arm swing and no postural instability. There has been no progression of symptoms or signs over a 1.5-year follow-up. Further treatment with medication was not undertaken.

Recordings were made with a concentric EMG needle (T.V.) in the left flexor carpi radialis (FCR), flexor digitorum profundus (FDP),



Video 8. Subject holds a 1 lb (0.45 kg) weight in left hand while standing, and tremor is noted.



Video 9. Subject holds a 10 lb (4.54 kg) weight while standing, producing the highest amplitude tremor, leading the physician to positively correlate weight of the held object with tremor amplitude.

extensor indicis propius (EIP), and extensor digitorum communis (EDC) muscles (Table 1). Motor activity and tremor in these muscles were captured acoustically and visually (with the gain set at 500 μ V and the sweep at 100 ms per division). The patient had mild intention (terminal) tremor seen intermittently; however, no EMG correlate was recorded in any of the muscles studied on intention. He had no resting tremor when the left arm was in his lap or relaxed by his side. The tremor could be elicited consistently by making a fist. On EMG, the tremor was noted consistently with heavier (2.27 kg or 4.54 kg) weights. In addition, the heavier the weight, the shorter is the latency to onset of tremor and the higher the tremor amplitude. EMG activity consistent with a 5–6 Hz tremor was noted in the EDC, EIP, and FDP but not in the FCR (see Videos 1 through 9).

Discussion

In this report, an 83-year-old male presented with a left wrist tremor; the tremor was elicited by bearing weight of 0.45 kg or more in his left arm, or by making a fist with the left hand. The tremor shares features with “isometric tremor,” or a tremor that occurs as a result of muscle contraction against a rigid stationary object.⁴ Isometric tremor belongs to the larger category of “action tremor,” which manifests when pushing against a wall or inert object, or when squeezing the fingers. Isometric tremor can occur in isolation or as part of another tremor syndrome, including Parkinson’s Disease (PD), essential tremor (ET), orthostatic tremor, cerebellar tremor, dystonic tremor, and Holmes tremor.⁵ Treatment of isolated isometric tremor is not well characterized, but may include pharmacologic therapy of accompanying tremor syndromes.

The patient appears to have an isolated isometric tremor, as he did not meet neurologic criteria for PD, ET, or other tremor syndromes. The frequency of the tremor was similar to that of PD, but there were no other signs of parkinsonism and no development of such signs during the 3 years prior to seeing us or during the 1.5 years that we have followed him (i.e., 4.5 years in total). The tremor was also unresponsive to dopamine replacement therapy. DaTscan was offered to the patient, but he declined this test. His tremor differed from a “task-specific” tremor, as the tremor was elicited upon at least two

Table 1. Summary of Tremor Activity as Observed Visually and with EMG in Forearm Muscles

	Visual Observation of Left Hand	Left EDC EMG	Left EIP EMG	Left FDP EMG	Left FCR EMG
Sitting at rest, hands resting on lap	–	–	–	–	–
Finger to nose maneuver	TT (1)	–	–	–	–
Standing with arms at rest at side	–	–	–	–	–
Standing with arms at side and making a loose fist with left hand	+	–	–	+	–
Standing with arms at side and making a tight fist with left hand	+	–	–	+	–
Standing with arms outstretched, hands open	–	–	–	–	–
Standing with arm outstretched, making a tight fist with left hand	+	+	–	+	–
Standing and holding a light object (1-lb weight) in left hand	+	–	–	–	–
Standing and holding a heavy object (5-lb weight) in left hand	+	+	+	+	–
Standing and holding a heavy object (10-lb weight) in left hand	+	+	+	+	–

EDC, Extensor Digitorum Communis; EIP, Extensor Indicis Proprius; EMG, Electromyography; FCR, Flexor Carpi Radialis; FDP, Flexor Digitorum Profundus; TT, Terminal Tremor; (1), Seen Intermittently; –, No Tremor Seen; +, Tremor Activity Present.

tasks: picking up any object that weighed (0.45 kg) or more, and when making a fist. There was also no dystonic posturing and, unlike dystonic tremor, which can occur when holding an object, the tremor in this patient occurred when he held an object of a specific weight. The heavier the weight, the shorter was the latency to onset of tremor and the higher the tremor amplitude. Likewise, the tremor was not typical of peripheral neuropathy-related tremor, and there were no signs of cerebellar dysfunction.

In 1995, Lang et al.⁶ described a “weight-holding tremor”. In that case, a 76-year-old male with ET and dystonia exhibited a weight-bearing tremor when carrying groceries. The tremor was thought to be an unusual task-specific form of ET. Their patient exhibited a 5 Hz tremor with EMG bursts <100 ms duration, alternating in flexors and extensors while holding a bag, similar to our patient. His tremor disappeared completely when the weight was removed. It is unknown whether the tremor occurred while the patient made a fist.

Tremor phenomenology is complex; even the more common tremor disorders (e.g., ET) can be misclassified. Although we were able to find another, somewhat similar case, we are unaware that the specific presentation of tremor that we encountered has been reported previously. We hope that a detailed clinical and EMG description of this tremor will be an aid to other neurologists who may be

encountering this or similar puzzling and/or difficult-to-classify tremors in their clinic patients.

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