



Treatment of Functional (Psychogenic) Tremor with a Mirror Box: A Case Report

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Abstract

An 18 year old right handed woman presented to the Muhammad Ali Parkinson Center (MAPC) at the Barrow Neurological Institute (BNI) with a marked tremor of her right hand. The tremor was disabling, preventing or hindering her from performing her activities of daily living (ADLs). An evaluation including a detailed neurological examination, brain magnetic resonance imaging (MRI) and a dopamine transporter scan (DAT- scan) was unrevealing. She did not have Parkinson disease (PD), or Essential Tremor (ET), or dystonic or task- specific tremor. She was diagnosed with a functional (psychogenic) tremor. She denied being anxious or depressed. There was no obvious secondary gain from her tremor: she was not working, was not claiming disability, and was living at home with her parents. She refused to accept a psychological or psychiatrist evaluation. She was referred for occupational therapy with a “mirror box”. A “mirror box” is a box with two mirrors in the center one facing each way originally invented to alleviate phantom limb pain by “tricking” the patient into believing the amputated limb is whole, moving, and painless. It has subsequently been adapted to treat a number of functional disorders. In our patient the “mirror box” relieved her tremor.

Introduction

Psychogenic movement disorder, implying a psychiatric origin, is a controversial term and recently “functional” movement disorder has been substituted for it [1-3]. Functional movement disorders account for at least 5.0 % of patients at a movement disorder clinic [1-3]. Among functional movement disorder one- third are tremors. The mean age of onset of functional tremor is 18-50 years. The ratio of females to males is 3:1 [1-3].

Functional tremor is usually characterized by an acute rather than a gradual onset, by disappearance with distraction, and by variability in character, frequency and amplitude at rest, on sustention and in action [1-3]. Functional movement disorders are a “Crisis for Neurology” because patients usually don’t accept the diagnosis, are reluctant to seek psychiatric care, and when they seek such care often, in our experience, don’t respond. We recently adapted “the Mirror box” as a tool to treat functional tremor [4-9]. The mirror box is a box with two mirrors in the center, one facing each way, invented by V. S. Ramachandran to alleviate phantom limb pain. The mirror box “tricks” the patient into believing the phantom (absent) limb is moving and painless. The mirror box has been adopted to “trick” or convince patients that their trembling limb is not actually trembling [6-9].

Case Report

An 18 year old right-handed young woman presented to the MAPC for evaluation of a right hand tremor. The onset of her tremor was acute. The tremor was variable and was inconsistently increased by physical activity. The tremor affected her activities of daily living to the point where she stopped using her right hand. Her handwriting was often legible often not. It did not exhibit micrographia. When asked about her tremor she said it was present all the time although it was distractible.

Neurological examination revealed no cranial nerve abnormalities, no head or chin or lip tremor. Muscle strength and tone were normal: there was no rigidity. There was no slowness of mov. There was no rigidity, no gait difficulty, and no postural instability. Sensory examination was normal. There was no family history of tremor.

Resting tremor was present in the right upper limb involving both proximal and distal muscles. Tremor was inconsistent, jerky, and of high and variable frequency. Tremor was distractible by talking to the patient and by asking her to move her left hand or left leg.

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Brain MRI was normal. A DAT- scan revealed no dopamine depletion. Neuropsychological revealed no obvious issues. She was neither unduly anxious nor depressed. There was no obvious secondary gain: she was not working, was not claiming disability, and was living with her parents at home without obvious financial pressures. She was not on any drugs that could produce tremor.

The patient was referred for occupational therapy for what she said was an incapacitating tremor of her right dominant hand. The main intervention was the use of a mirror box. During mirror box therapy her left upper limb which had no tremor was reflected as her right upper arm, while her right upper limb was outside the box and invisible to the patient. In this setting the absence of tremor in her left upper limb was seen, by the patient as an absence of tremor in her right upper limb and the tremor in her right upper limb (held outside the box) decreased in amplitude at rest, on sustention and during action.

The patient was instructed on how to use the vanity mirror in her home to have her left non- trembling upper limb reflected as her right in various positions. This maneuver over several days resulted in the tremor in her right upper limb disappearing.

Discussion

The concept of the mirror box is based on the concept of “reflective illusion.” It was popularized by Ramachandran to treat the pain of phantom limb pain [4,5,10]. He used the term “learned paralysis”. The mirror box consists of a mirror in the center. The upper limbs are placed on the both sides of the mirror. The affected, trembling limb, is always covered and the unaffected limb is placed on the other side whose reflection is seen in the mirror to create an optical illusion: that the trembling limb is not trembling. This, in time, reinforces the idea that the patient’s trembling hand is normal and not trembling [4-11]. Perhaps this occurs by neural reorganization through sensorimotor feedback from the non trembling limb causing the trembling limb to cease [4,5,11-14]. The success of the mirror box to treat the pain of phantom limb is well established [4]. A similar principle may hold for functional tremor [7,8,10].

The mirror box does not treat the root cause of the functional tremor which may be difficult to uncover even with extensive psychotherapy. The treatment outlined, however, does provide a simple way to provide relief, even temporarily, for the patient.

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