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Letter to the Editor

Towards an update in the neurophysiological assessment of functional tremors

I read with interest the letter by Gironell, recently accepted for publication in this Journal (Gironell, 2018). The Author suggested the diagnosis of a definite functional (psychogenic) tremor for the case we previously described in the article entitled "Holmes' or functional tremor?" (Bocci et al., 2018). We completely agree with his interpretation, based both on clinical and neurophysiological features (Gironell, 2016; Schwingenschuh et al., 2016); nonetheless, given the common superimposition of organic and non-organic etiologies, we preferred to justify our views about the final diagnosis.

In our article, we proposed a fast test battery for tremor's assessment. In particular, we think that surface polymyography should: (1) compare the frequency between tremor at rest and postural tremor; (2) evaluate the amplitude of jerks during mass loading; (3) assess jerks' synchronization between antagonistic muscles during contralateral motor performance (preferentially guided by an external device) and (4) evaluate a possible tremor inhibition during ballistic movements. Altogether, in addition to the extensive neurophysiological criteria proposed by Gironell (2016) and Gironell et al. (1997), we suggest to focus the attention on frequency changes between rest and postural tremor; moreover, we suggest to use both endogenous and non-endogenous triggers (e.g. a metronome) to evaluate jerk synchronization.

Finally, for a complete neurophysiological assessment, we usually study the recovery cycle of the blink reflex (BR), as well as possible changes in the amplitude of Motor Evoked Potentials (MEPs) during motor imagery (MI). A normal BR recovery cycle suggests a normal brainstem interneuron excitability, distinguishing between organic and functional movements disorders (Nisticò et al., 2012; Schwingenschuh et al., 2011). Conversely, a paradoxical decrease of motor excitability during motor imagery, as assessed by Transcranial Magnetic Stimulation (TMS), represents the electrophysiological correlate of a disturbed voluntary control in motor conversion disorders (Liepert et al., 2009; Liepert et al., 2011); in our experience, in line with existing literature, decreased MEP amplitudes during MI are found both in hypokinetic and hyperkinetic functional disorders and this abnormality is not restricted to the clinically affected body part. For instance, Fig. 1 shows MEPs recorded at rest and during MI in the patient we reported in previous paper (Bocci et al., 2018).

Overall, in the assessment of functional tremors, we agree with the use of the standardized neurophysiological protocol proposed by Gironell (2016), possibly comprising the evaluation of both BR recovery cycle and MEPs during MI.

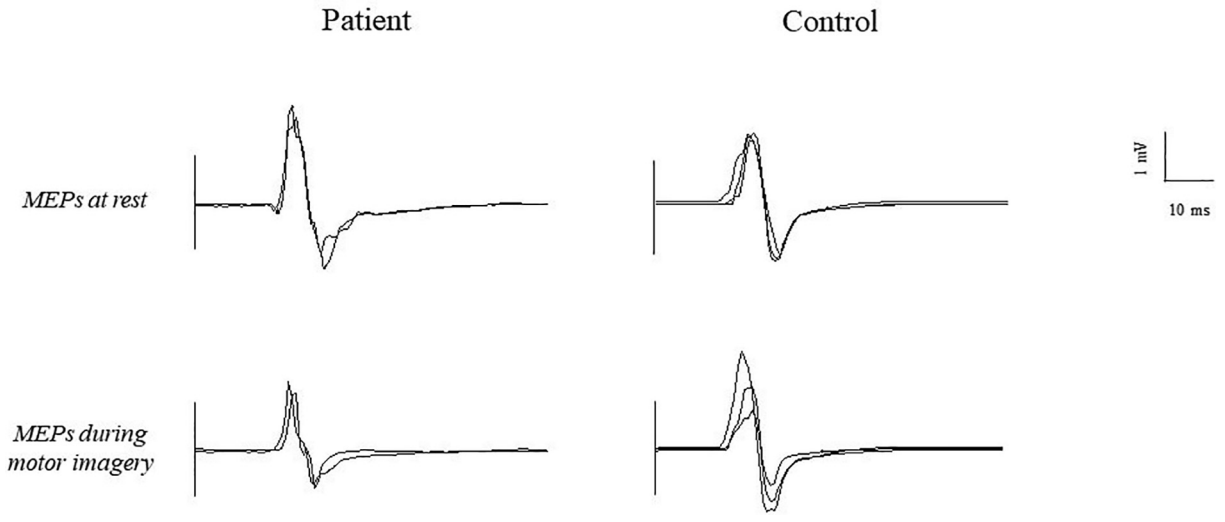

Fig. 1. Motor Evoked Potentials (MEPs) by Transcranial Magnetic Stimulation (TMS) recorded from the *abductor digiti minimi* muscle at rest (top traces) and during motor imagery (bottom traces) in our patient (Bocci et al., 2018) and in an healthy volunteer. Note the paradoxical decrease of MEP amplitudes during MI in the patient compared to the control.

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Conflict of interest statement

None.

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