

A Case of Functional Belly Dancer's Dyskinesia

Hyun Joo Cho, MD,¹ Pattamon Panyakaew, MD,² Prachaya Srivanitchapoom, MD,³ Mark Hallett, MD^{1,*}

Belly dancer's dyskinesia (BDD) is described as undulating rhythmical movements of the abdominal wall, an appearance that resembles belly dancing. It would be possible to mimic these movements voluntarily, and hence the disorder could be functional. Here, we report on the first case of functional BDD with supporting clinical neurophysiology.

Case Description

A 51-year-old right-handed woman presented with abnormal abdominal movements for 9 years. She was in good health until she suddenly felt extreme pain in the middle of her back and the right leg during Pilates class. A few days later, she developed constipation, bloating, and severe pain in abdominal muscles. In 3 months, she started noticing slow writhing and undulating belly movements. Her movements were continuous during the day, but it was not clear whether it persisted during sleep. She started seeking medical attention and was found to have left ninth rib fracture. She underwent a rib repair surgery. She also received fundoplasty for acid reflux, which did not abate the symptoms. Because of chronic pain, she had CT-guided T8/T9 nerve root block followed by intercostal nerve block at T8/9 and T12 level, which resulted in pneumothorax without benefit. Her movements became more intense and disabling along the course. Six years after the onset of her symptoms, she was diagnosed with BDD by a movement disorder specialist. She was started on clonazepam, baclofen, and gabapentin as well as botulinum neurotoxin injection in bilateral rectus abdominus, abdominal external oblique (AEO), and left thoracic paraspinous muscles, which was slightly helpful.

Neurological exam showed slow abdominal contraction that caused either undulating or circular umbilical movements (see Video 1). She could stop the movement by holding her

breath when suggested to do so. The movements were neither distractible nor entrainable to hand tapping and alternating hand movement.

MRI of her brain and spine were normal. Surface electromyography (EMG) showed irregular EMG bursts with variable duration of 1,000 to 3,000 ms and cocontraction in bilateral AEO. Frequency varied from 0.3 to 1 Hz (Fig. 1A). The movements completely disappeared with sleep on EEG-EMG recording (Fig. 1B). Jerk-locked back-averaging of EEG-EMG was performed by placing the marker at the onset of EMG activity of AEO and back-averaging EEG in central leads (Fz, Cz, F3, F4, C3, and C4) for $-3,000$ ms to $+1,000$ ms from the marker. A slowly rising negative potential was observed in central leads, starting around 1000 ms preceding movement onset consistent with a Bereitschaftspotential (BP) (Fig. 1C). The diagnosis of functional BDD was made based on presence of BP, in addition to clinical features of suggestibility and variability of the movement.

Discussion

BDD is a rare movement disorder of undulating or circular abdominal contraction that has been related to number of possible etiologies. It has been reported in patients with spinal cord or basal ganglia lesions.^{1,2} In cases of spinal cord pathology, the movements would generally continue during sleep. In our patient, the movement disappeared with sleep, which argued against peripheral or spinal cord origin. She also had normal brain and spine MRI. BDD also has been linked to levodopa or antipsychotic exposure,³ which was not present in our patient. BDD has been reported after local trauma, such as abdominal surgery.⁴ There is a great deal of debate whether trauma can cause this movement disorder or whether trauma is a trigger for a functional disorder.^{5,6}

¹Human Motor Control Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, Maryland, USA;

²Department of Medicine, Faculty of Medicine, King Chulalongkorn Memorial Hospital, Chulalongkorn University, Bangkok, Thailand; ³Department of Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand

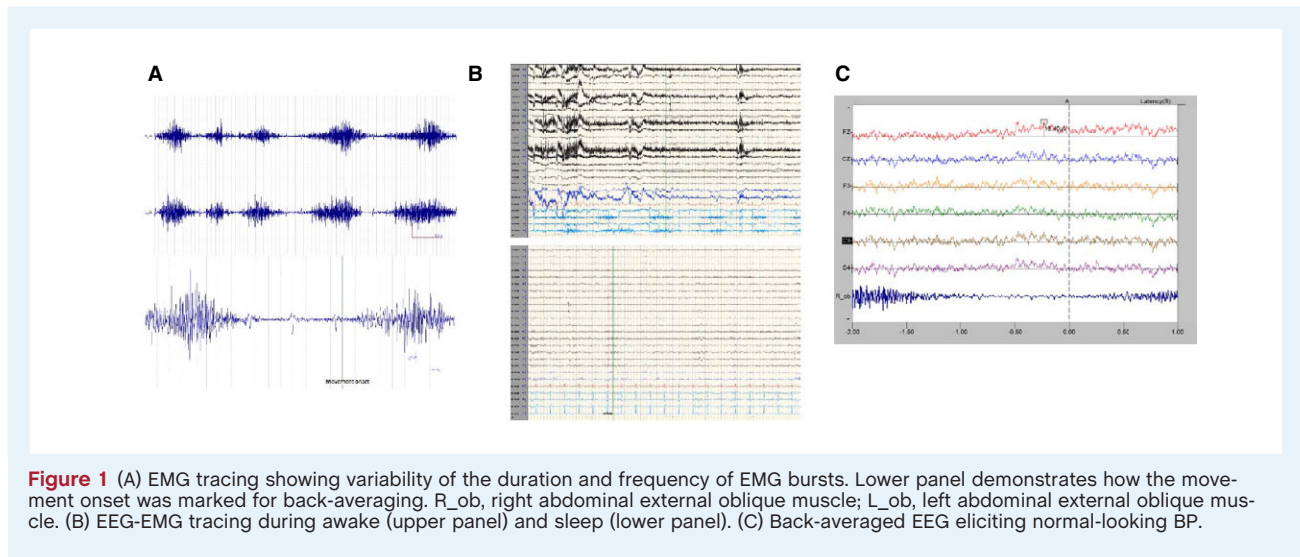
*Correspondence to: Dr. Mark Hallett, Human Motor Control Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health, 10 Center Drive, MSC 1428, Building 10, Room 7D37, Bethesda, MD 20892, USA; E-mail: hallettm@ninds.nih.gov

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Physiological study with EMG can be helpful in differential diagnosis. BDD can be distinguished from propriospinal myoclonus, wherein EMG activity has a specific temporospatial distribution. EMG can also be helpful in identifying functional movement disorders. There are suggested electrophysiological test criteria for diagnosis of functional myoclonus and tremor⁷; however, they may be difficult to apply to dyskinesia or dystonia. Nonetheless, they share general hallmarks of being functional, including suggestibility, entrainability, and distractibility. Back-averaging of EEG-EMG is a useful diagnostic tool to identify FMD in patients with suitable symptoms. BP cannot be recorded in patients with continuous abnormal movements because it is necessary to have multiple discrete onsets that would serve as points from which to back-average. Our patient had breaks in her abnormal movements, which allowed the recording of the BP. A BP preceding movement indicates involvement of the premotor/supplementary motor cortex in the preparation for movement.⁸ This potential can be recorded in patients with functional myoclonus, but not with organic myoclonus.⁹ In a large cohort of propriospinal myoclonus patients, approximately 50% clinically diagnosed as organic propriospinal myoclonus by a movement disorder expert turned out to be functional based on presence of BP and EMG characteristics.¹⁰ This observation can now be extended to BDD. The presence of a BP in our case indicates that BDD can be functional. Therefore, we suggest that looking for BP should be considered for differential diagnosis of abnormal axial movements after excluding identifiable underlying causes.

Author Roles

(1) Research project: A. Conception, B. Organization, C. Execution; (2) Manuscript: A. Writing of the First Draft, B. Review and Critique.

H.J.S.C.: 1A, 1B, 1C, 2A, 2B

P.P.: 1B, 1C, 2B

P.S.: 1B, 1C, 2B

M.H.: 1A, 1C, 2B

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Supporting Information

A video accompanying this article is available in the supporting information here.

Video 1. A 51-year-old woman with continuous slow undulating movements of the abdomen resembling a belly dance.