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Psychopathology and Psychogenic Movement Disorders

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Abstract

Psychogenic movement disorder is defined as abnormal movements unrelated to a medical cause and presumed related to underlying psychological factors. Although psychological factors are of both clinical and pathophysiological relevance, very few studies to date have systematically assessed their role in psychogenic movement disorder. We sought to assess the role of previous life stress using validated quantitative measures in patients with psychogenic movement disorder compared with age- and sex-matched healthy volunteers as well as a convenience sample of patients with focal hand dystonia. Sixty-four patients with psychogenic movement disorder (72% female; mean age, 45.2 years [standard deviation, 15.2 years]), 38 healthy volunteers (74% female; mean age, 49 years [standard deviation, 13.7 years]), and 39 patients with focal hand dystonia (37% female; mean age, 48.7 years [standard deviation, 11.7 years]) were evaluated using a standardized psychological interview as well as validated quantitative scales to assess trauma and previous stressors, depression, anxiety, and personality traits. Patients with psychogenic movement disorder reported higher rates of childhood trauma, specifically greater emotional abuse and physical neglect, greater fear associated with traumatic events, and a greater number of traumatic episodes compared with healthy volunteers and patients with focal hand dystonia controlled for depressive symptoms and sex (Bonferroni corrected $P < .005$). There were no differences in categorical psychiatric diagnoses or scores on childhood physical or sexual abuse subscales, personality traits, or the dissociative experience scale. Our findings highlight a biopsychosocial approach toward the pathophysiology of psychogenic movement disorder, although the association with psychological issues is much less prominent than expected compared with the nonepileptic seizure population. A careful psychological assessment is indicated to optimize therapeutic modalities.

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Keywords

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Psychogenic movement disorder (PMD) is a clinical syndrome of abnormal movements that is not explained by a medical disorder. PMD can be associated with significant disability, may persist for decades, and occurs in 2%-3% of movement disorder clinic patients, although its prevalence may be as high as 20% in some centers.[1] Although PMD is presumed to be related to psychological factors, the issue is poorly understood despite holding both pathophysiological and clinical importance. Psychological factors are a supportive criterion in determining the degree of certainty of the diagnosis of PMD,[2] but their presence is not a requirement for diagnosis. Although the presence of psychological factors may support the neurologist's certainty regarding the diagnosis of PMD, a recent survey demonstrated that many neurologists were comfortable making the diagnosis of PMD even when there were no clear precipitating psychological factors.[3] This issue becomes particularly difficult when referring patients to psychiatrists or psychologists, as the diagnostic framework of PMD and the psychiatric diagnosis of conversion disorder, the closest equivalent to PMD in the Diagnostic and Statistical Manual of Mental Disorders, version IV (DSM-IV), differ on this point.[4] The diagnostic criterion of conversion disorder requires the clinician to identify underlying psychological factors contributing to the initiation or exacerbation of the symptoms or deficits, which may not be identifiable in every patient with PMD. Notably, however, the necessity for identification of an associated psychological factor for the diagnosis of conversion disorder may no longer be a requirement for diagnosis in proposed revisions of the DSM-V.[5] Identifying psychiatric comorbidities is of clinical significance, as its presence has been shown to be predictive of better clinical outcomes.[6] From a pathophysiological perspective, understanding whether, how, and what type of psychological factors are associated with PMD can shed light on how and why these symptoms develop.

Compared with patients with Parkinson's disease, PMD patients score higher on a range of psychiatric symptoms including global distress, anxiety, depression, and somatization and have greater impairments in mental health quality of life.[7] Using categorical diagnoses, PMD patients had high frequencies of lifetime major depression (42.9%), anxiety disorders (61.9%), and personality disorders (45%), although there was no comparative control group.[6] Despite the importance of psychological factors from a clinical and mechanistic perspective, PMD has not been psychologically described in a comprehensive manner. We sought to compare psychological features of PMD patients with age- and sex-matched healthy volunteers (HVs), as well as with a convenience sample of patients with an organic movement disorder, focal hand dystonia (FHD), using quantitative measures. While attempting to validate the psychometrics that have been documented in PMD patients previously, such as psychiatric diagnoses[6] and self-ratings of depression and anxiety,[7] we also used quantitative measures to characterize previous stressors or trauma and to quantify personality traits. Based on the observation that conversion disorder is associated with a greater history of childhood trauma and number of lifetime stressors,[8,9] we hypothesized that there would be higher rates of childhood and lifetime trauma in PMD patients.

Patients and Methods

Subjects

Patients with PMD and FHD were recruited from the Human Motor Control Section of the Medical Neurology Branch at the National Institute of Neurological Disorders and Stroke (NINDS). Sixty-four PMD patients assessed at NINDS between 2005 and 2007 participated in the study, and a subset were matched with 39 age- and sex-matched healthy controls. Thirty-nine patients with FHD were recruited from a convenience sample of patients assessed at the Human Motor Control Section clinic or at the Botulinum Toxin clinic at NINDS. PMD patients were included if they had "clinically definite"[2] PMD diagnosed by at least 2 neurologists (1 neurologist was always M.H. and the other a neurologist). Patients were included if they were at least 18 years old with PMD or FHD and had no other serious neurological or medical illnesses. Healthy volunteers were recruited from the NIH healthy volunteer database. Healthy individuals were excluded if they reported a history of neurological disorders, traumatic brain injury, or a major current psychiatric disorder. All individuals in the study agreed to participate upon written consent approved by the National Institutes of Health Institutional Review Board.

Assessments

PMD and FHD patients were assessed by a neuropsychiatrist (V.V.) or neuropsychologist (R.A.) using the Structured Clinical Interview for DSM-IV Axis I (SCID-I) psychiatric disorders. All subjects were administered the following self-report psychiatric measures.

Childhood and recent stressors were assessed using the:

1. Childhood Trauma Questionnaire (CTQ), a 28-item questionnaire quantifying physical, sexual, and emotional abuse as well as physical and emotional neglect using Likert scales to rate each item. Minimization and denial are assessed by 3 items that detect false-negative trauma reports (score range for each subscale, 5–25).[10]
2. Trauma Life Events Questionnaire (TLEQ), a 23-item self-report questionnaire quantifying 22 types of traumatic events.[11] For each event scored as a trauma (score range, 0–23), subjects provide the number of episodes (scored as "never" to "more than 5"; score range, 0–115) and whether fear, helplessness, or horror was present (yes/no; score range, 0–23).
3. Social Readjustment Scale, which quantifies stress within the past year using "life change units" that apply to events that have occurred in the past year. The presence of negative and positive events is recorded, and the total score assigned to each event is summed—for example, death of a spouse 100 units, retirement 45 units, vacation 13 (scores < 150 have a slight risk of illness, 150–299 have a moderate risk, > 300 are at risk of illness).[12] Only PMD and FHD patients filled out this questionnaire and were specifically asked to indicate events that had occurred in the year prior to onset of their motor symptoms.

4. Parental Bonding Instrument (PBI), which quantifies the level of maternal and paternal caring and overprotection using 25 Likert-scale statements to measure the level of parental "affection" ("spoke to me in a warm and friendly voice") or "control/overprotectiveness" ("tried to control everything I did'). Maternal and paternal scores are obtained for "care" (score, 0–36) and "control" (score, 0–39).[13]

Personality traits were quantified using the Revised Neuroticism-Extroversion-Openness Personality Inventory (NEO PI-R). The NEO PI-R is a well-validated psychological personality inventory with 240 items encompassing 5 factors of personality including neuroticism, extraversion, openness to experience, agree-ableness, and conscientiousness.[14]

Anxiety was assessed using the Beck Anxiety Inventory (BAI), a 21-item scale that was subdivided into symptoms of panic, neuropsychological, autonomic, and subjective anxiety (total score, 0–63). Depression was assessed using the Beck Depression Inventory (BDI), a 21-item scale (total score, 0–63). The Dissociative Experiences Scale (DES) is a 28-item questionnaire that was used to quantify dissociative pathology. Conversion disorder and particularly nonepileptic seizures have been associated in some but not all studies with higher dissociative symptoms (measured using the DES or categorical diagnoses of dissociative disorders).[15] Conversion disorder is also categorized within dissociative disorders in the International Classification of Mental and Behavioral Disorders (ICD-10).

Statistical Analysis

The variables were first tested for normality using the Shapiro–Wilks test. The tests that were not normally distributed ($P < .05$) were $\log_{10}$-transformed (all CTQ and TLEQ subscales, maternal caring, and overprotection of the PBI, SRS, DES, BDI), and ANOVA was used to compare groups. $P < .005$ Bonferroni corrected for multiple comparisons was used for our hypotheses, focusing on 8 variables assessing previous stressors (total CTQ and subscales of TLEQ, SRS, and PBI). As total CTQ score was significantly different, the CTQ subscales were analyzed to determine which type of trauma contributed to the total score. To assess if depression could account for the differences observed, an ANCOVA was conducted with BDI as a covariate of no interest for the significant variables. The Fisher exact test was used for categorical variables. Statistical Package for the Social Sciences 16.0 (SPSS) was used for all statistical analyses.

Results

Subject Characteristics

Sixty-four PMD (46 of 64 female [72%]; mean age, 45.42 years [SD, 15.24 years]), 39 FHD (28 of 39 female [74%]; mean age, 48.65 years [SD, 11.66 years]), and 39 healthy volunteers (28 of 39 female [74%]; mean age, 48.97 years [SD, 13.64 years]) were assessed. PMD patient characteristics are shown in Table 1. Many patients had more than 1 movement symptom. Prior to assessment at the NIH, all patients had been assessed by at least 1 neurologist, and 64% were assessed by 2 or more neurologists. Eighty-eight percent of PMD patients had not previously seen a psychiatrist. Thirty-three percent of patients had 1 or more emergency room visits, and 12% had been hospitalized.

Lifetime Stressors

PMD patients reported higher rates of total childhood trauma (CTQ), greater fear associated with traumatic events, and a greater number of traumatic episodes (TLEQ) compared with HVs and FHD patients (Bonferroni corrected $P < .005$; Table 2). In particular, emotional abuse and physical neglect in childhood, from the CTQ, was higher than in HVs and FHD patients. PMD patients reported greater physical abuse (CTQ), a greater number of traumatic events (TLEQ), and lower scores on perceived paternal and maternal care relative to HVs and FHD patients, but these variables were no longer significant after correction for multiple comparisons. There were no group differences in the CTQ minimization/denial subscale. Emotional abuse, physical neglect, fear associated with traumatic event, and the number of traumatic episodes remained significant after covarying for depression scores (Table 2) and sex ($P < .05$, $P < .0001$, $P < .05$, and $P < .05$, respectively). There was no significant difference in scores on the Social Readjustment Scale. On the TLEQ, of the 39 PMD patients who reported a traumatic event, the majority occurred more than a year before symptom onset (24 of 39, 62%), compared with those that occurred in the year of symptom onset (8 of 39, 21%) or after symptom onset (7 of 39, 18%). Of the healthy controls who noted the last occurrence, 20 of 32 of those occurred more than a year before assessment (63%), 5 of 32 in the year prior to assessment (16%), and 7 of 32 were not applicable. The proportions of occurrences of PMD and healthy controls happening more than a year before symptom onset and within a year of symptom onset or the year prior to assessment were compared using chi-square analysis (chi-square, 0.59; $P = .44$).

Other Psychological Issues

Although categorical diagnoses of depressive and anxiety disorders did not differ between PMD and FHD patients, PMD patients reported more severe depressive and anxiety scores relative to FHD patients and HVs, including when controlling for sex differences ($P < .0001$) (Table 3). In particular, PMD patients reported greater neurophysiological symptoms of anxiety compared with FHD patients and HVs but not subjective symptoms of anxiety. PMD patients had lower scores on the conscientiousness subscale of the NEO PI-R compared with HVs, which were no longer significant after covarying for depression (Table 4). There were no differences on the neuroticism subscale or dissociative experiences scores.

Discussion

The psychological profile of PMD patients is of both clinical and pathophysiological relevance, yet is poorly studied. Here we quantify psychological features such as stressors and personality traits in PMD patients with chronic symptoms compared with matched HVs and a convenience sample of patients with an organic movement disorder, FHD. PMD patients reported greater histories of emotional abuse and physical neglect, greater fear associated with traumatic episodes, and a greater number of traumatic episodes.

Early Life Stressors

We demonstrate an association with early life stressors but not with stressors the year prior to symptom onset. As early life stressors also contribute to depression and anxiety disorders[16] and depressive or anxious state may also contribute to recall bias, we conducted

subanalyses in the PMD population to control for this confounder. Factors that demonstrated a trend ($P < .05$) but were not significant after Bonferroni correction ($P < .005$) such as physical abuse, number of traumatic events, and paternal and maternal caring no longer demonstrated a trend after covarying for depression. There was also no difference in minimization scores on the CTQ in the PMD population, indicating that there were no differences in the likelihood of underreporting maltreatment.

There are several implications of these findings. This PMD population differs from that of conversion disorder, in which patients are diagnosed and selected based on the presence of previous stressors, thus suggesting that selection bias is less of an issue in the present findings.

That we did not observe differences in past experience of sexual or physical abuse is consistent with a study demonstrating differences between nonepileptic seizure patients compared with motor conversion disorder patients; nonepileptic seizure patients are more likely to have a history of sexual abuse, have a lower perception of parental care, and have more life events in the 12 months before symptom onset.[17] However, a meta-analytic review of 34 studies investigating the link between nonepileptic seizures and childhood sexual abuse demonstrates an association but cautions against definitive conclusions.[18] Our data distinguish between different types of childhood abuse and trauma that may have implications for the semiology of a patient's conversion symptoms. For instance, specific forms of childhood abuse such as sexual or physical abuse may predispose toward more intermittent symptoms. From a pathophysiological perspective, our findings highlight a biopsychosocial conceptualization of PMD emphasizing a role for environmental factors during early life in predisposing patients toward the development of symptoms. The role of environmental factors can also represent an interaction between environment and biology. As an example of such interaction, early life stress is linked to a greater vulnerability toward major depression, hypothesized to be mediated by neuroendocrine response.[16] These various mediating variables may in turn augment susceptibility toward the development of depression following new stressors. Our data also have implications from a clinical perspective. Thus, subjects who report a history of sexual or physical abuse are not more likely to have a diagnosis of PMD, suggesting that the presence of a history of sexual or physical abuse should not influence or bias our diagnoses.

Anxiety Symptoms

PMD patients have greater scores on depressive and anxiety measures, consistent with previous findings in PMD[6,7] and in motor conversion disorders.[19,20] Our findings extend the literature to emphasize that PMD patients experience neurophysiological rather than subjective features of anxiety. These findings are consistent with the observation that conversion disorder patients with mixed symptoms have greater arousal during the illness state, as indicated by galvanic skin response, higher baseline cortisol, reduced heart rate variability, and greater threat vigilance.[21,22] PMD patients have greater eyeblink startle response to arousing stimuli compared with healthy volunteers linking arousal to a reflexive motor response.[23] Similarly, conversion disorder patients with PMD symptoms have greater amygdala activity to arousing stimuli and impaired habituation along with greater functional

connectivity between the amygdala and supplementary motor area.[24] Our current findings are consistent with the observation that PMD patients show greater physiological arousal as well as responses to arousing stimuli. Further studies investigating the relationship between anxiety, arousal, and psychogenic movement symptoms would be of utility.

Personality Traits

Using quantitative personality scales to assess dimensional personality traits rather than categorical personality diagnoses, there were no significant differences between PMD patients and healthy controls. A previous study without a control group using categorical diagnoses of personality disorders demonstrated personality disorders in 45% of PMD patients.[6] We did not observe any differences in the trait of neuroticism in PMD patients. The trait of neuroticism is an enduring tendency to experience negative emotional states; it is a well-validated construct and an established genetic risk factor for depressive and anxiety disorders.[25,26] That we did not observe any clear differences between groups in personality traits is consistent with the observation that different conversion subtypes may be associated with differing personality traits. For example, using categorical personality diagnoses, patients with motor conversion disorder are less likely to be associated with borderline personality disorder compared with nonepileptic seizures disorder.[17]

The Role of Psychological Factors

We had expected that PMD patients would score higher on physical and sexual abuse trauma scales and recent stressors and on dissociation scores, given the literature on nonepileptic seizures,[8,9] fixed dystonia,[27,28] and motor conversion symptoms with paralysis,[29] and would also score higher on neuroticism subscales.[6,29] There are several possible interpretations for these negative findings. A larger sample size may be required to demonstrate differences. The use of detailed clinical interviews may also be more appropriate. Alternatively, this study represents the first systematic detailed study of psychological factors in outpatient PMD patients who have not been selected to have conversion disorder (and hence are not selected to have psychological issues as a causative factor). Indeed, PMD may be less likely to be associated with psychological factors than previously believed. Thus, although milder forms of early trauma, fearful responses related to the trauma, depression, and neurophysiological manifestations of anxiety are important from a mechanistic perspective, the issue of psychological factors may be less relevant from a diagnostic perspective. For psychological issues to be a reliable diagnostic criterion would require consistent association with all subjects, discrimination from other diagnoses, and being consistently clinically identifiable. This issue has been discussed previously in the context specifically of PMD[4] and conversion disorder and is consistent with the recommendation to remove criteria B, the association with psychological factors, from revisions of the conversion disorder criteria of DSM-V.[5] However, we emphasize that the issue of diagnosis differs from that of pathophysiological mechanisms.

Limitations

This study is limited by the lack of an age-, sex-, and disability-matched organic movement disorders control group or psychiatric disorders group. The patient group may also be biased, as the NIH is a tertiary-care center that may bias toward more severe or chronic

disorders. Patients with more acute symptoms may present with a different pathology; further studies would be required to clarify this issue. We did not report the number of patients that did not take part in the study. We did not control for socioeconomic status in the control groups, which may influence the exposure to previous traumatic experiences. However, we note that recruitment from the NIH healthy volunteer database of the age range specified in the study includes a range of employed, part-time employed, unemployed, retired, and stay-at-home parents as healthy volunteers. FHD is more commonly male, and the percentage of women is in keeping with an unselected sample. A larger sample size would also be useful to avoid type I errors when interpreting negative findings. We note also that the low response rate in the Social Readjustment Scale may reflect an incomplete measure bias. Although clinician interview rather than a self-rated scale may be a more sensitive method of assessment for childhood trauma, we note that the subscale of minimization or denial in the CTQ was not different between groups, and 2 different trauma measures were also used. The data are most relevant for patients with chronic movement symptoms. Comparison with a patient group with acute symptoms would be of utility. The population was assessed in North America and may be culturally specific. This study is particularly relevant to pathophysiology. The questionnaires cannot be used on an individual basis to differentiate between groups and hence are not as relevant on a diagnostic basis.

Conclusions

Our findings demonstrate a role for early-life stressors and trauma in the pathophysiology of PMD, thus emphasizing a biopsychosocial approach toward the understanding of PMD. Because only a subset of individuals exposed to these stressors develop PMD and as not all PMD subjects have a history of stressors or trauma emphasizes the role of other susceptibility factors including genetic and biological factors. The study of PMD patients without clear antecedent stressors or depressive or anxiety symptoms and the comparison with patients with clear associated psychological issues would be of great interest. We further emphasize the necessity of assessment for psychological factors to optimize therapeutic options.

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TABLE 1

Subject characteristics

PMD symptom	
Tremor	40 (62%)
Dystonia	11 (17%)
Myoclonus	8 (12%)
Gait/balance	19 (29%)
Weakness	10 (15%)
Speech	8 (12%)
Onset	
Acute	39 (61%)
Gradual	25 (39%)
Age at onset, y (SD)	40 (15)
Symptom duration, y (SD)	6(7)
Marital status	
Single	23 (40%)
Married	31 (53%)
Divorce	3 (5%)
Widowed	1 (2%)
Employment	
Unemployed	15 (23%)
Employed part-time	14 (22%)
Employed full-time	6 (9%)
Student	8 (13%)
Disability	17 (27%)
Homemaker	2 (3%)
Medication	
Antidepressant	22 (34%)
Benzodiazepine	22 (34%)
Anticonvulsant	5 (7.6%)
Dopaminergic medication	4 (6.2%)
Antipsychotic	1 (1.5%)

All scores are reported as n (%) unless otherwise indicated.

Abbreviations: PMD, psychogenic movement disorder; HVs, healthy volunteers; FHD, focal hand dystonia; SD, standard deviation.

TABLE 2

Life stressors

	PMD (n = 64)	HVs (n = 39)	FHD (n = 39)	*F*	*P* value*
Childhood Trauma Questionnaire					
Total	44.2 (18.8, 56)	34.5 (13.1, 33)	28.5 (9.3, 35)	15.8	< .0001, < .0001
Emotional abuse	10.4 (5.6, 56)	6.9 (3.4, 33)	7.5 (4.1, 38)	8.2	< .0001, 0.007
Physical abuse	7.7 (3.6, 56)	6.4 (3.7, 33)	6.1 (1.7, 36)	4.4	.01, .09
Sexual abuse	6.7 (4.9, 56)	6.0 (3.9, 33)	6.0 (3.2, 37)	0.4	.7
Physical neglect	11.8 (6.2, 56)	8.2 (3.5, 33)	6.6 (2.2, 37)	12.9	< .0001, < .0001
Emotional neglect	7.5 (3.5, 56)	6.4 (2.3, 33)	8.1 (3.8, 38)	2.5	.10
Minimization/denial	0.6 (1.0, 56)	0.7 (1.1, 33)	0.3 (0.7, 38)	0.07	.93
Trauma Life Events Questionnaire					
Number of events	5.6 (3.5, 44)	3.9 (2.6, 34)	4.3 (2.8, 28)	3.7	.03, .3
Event fear	3.1 (2.9, 44)	1.4 (1.9, 34)	1.6 (1.5, 28)	7.4	.001, .02
Number of episodes	13.4 (12.0, 44)	6.9 (6.5, 34)	7.6 (7.4, 28)	7.4	.001, .04
Parental Bonding Inventory					
Maternal care	21.7 (12.0, 48)	28.0 (7.5, 36)	24.6 (10.1, 29)	4.9	.009, .06
Paternal care	19.3 (10.9, 44)	24.5 (9.2, 33)	26.5 (8.1, 29)	4.5	.01, .13
Maternal overprotection	12.9 (9.4, 48)	10.8 (6.3, 36)	14.7 (10.5, 29)	0.9	.38
Paternal overprotection	11.3 (7.7, 44)	11.6 (7.8, 33)	10.5 (7.8, 29)	0.1	.94
Social Readjustment Scale	94.7 (90.2, 56)		133.7 (142.6, 20)	0.005	.99

All scores are reported as mean (SD, n).

Abbreviations: PMD, psychogenic movement disorder; HVs, healthy volunteers; FHD, focal hand dystonia; SD, standard deviation.

* *P* value is reported first, followed by the P value covaried for depression. Childhood Trauma Questionnaire: subscale score range, 5-25. Trauma Life Events Questionnaire: traumatic events score range, 0-23; number of episodes the trauma occurred (scored from “never” to “more than 5”) score range, 0-115; experienced fear, helplessness, or horror with event (scored as yes/no) score range, 0-23. Parental Bonding Inventory: maternal and paternal scores for “care” range, 0-36; and “control” score range, 0-39. Social Readjustment Scale: scores < 150 have a slight risk of illness; 150-299 have a moderate risk; >300 are at risk of illness.

TABLE 3

Psychiatric disorders, depression, and anxiety

	PMD	HVs	FHD	Chi-square or *F*	*P* value
SCID (%)					
Major depression (lifetime)	37.1%		33.3%	0.2	.83
Generalized anxiety disorder	20.0%		15.3%	0.4	.61
Phobia	14.3%		12.8%	0.03	1.0
Panic disorder	2.9%		2.6%	0.03	1.0
Beck Depression Inventory	10.7 (8.4, 57)	4.0 (4.7, 38)	6.4 (5.6, 28)	11.6	< .0001
Beck Anxiety Inventory	14.6 (9.8, 58)	2.6 (3.9, 38)	6.1 (6.8, 28)	31.7	< .0001
Subjective	0.3 (0.2, 55)	0.4 (0.4, 38)	0.5 (0.3, 28)	3.0	.06
Neurophysiological	0.6 (0.2, 55)	0.3 (0.4, 38)	0.4 (0.3, 28)	31.5	< .0001
Autonomic	0.1 (0.1, 55)	0.3 (0.4, 38)	0.1 (0.2, 28)	1.4	.25
Panic	0.09 (0.08, 55)	0.04 (0.1, 38)	0.009 (0.03, 28)	2.4	.11

All scores are reported as mean (SD, n). Beck Depression Inventory and Beck Anxiety Inventory: score range, 0-63.

Abbreviations: PMD, psychogenic movement disorder; HVs, healthy volunteers; FHD, focal hand dystonia; SD, standard deviation.

TABLE 4

Other psychological factors

	PMD (n = 64)	HVs (n = 39)	FHD (n = 39)	*F*	*P* value*
Personality (NEO PI-R)					
Neuroticism	82.8 (29.5, 55)	73.1 (20.1, 31)		1.0	.11
Extraversion	108.4 (21.9, 55)	113.6 (17.0, 30)		1.2	.27
Openness	111.1 (18.3, 55)	113.9 (13.6, 30)		0.5	.46
Agreeableness	132.4 (16.9, 55)	127.8 (16.2, 30)		1.5	.23
Conscientious	122.7 (18.5, 55)	132.6 (15.9, 30)		6.1	.02, .27
Dissociative Experience Scale	6.4 (6.5, 53)	4.9 (10.0, 36)	5.6 (5.08, 22)	0.5	.63

All scores are reported as mean (SD, n).

Abbreviations: PMD, psychogenic movement disorder; HVs, healthy volunteers; FHD, focal hand dystonia; SD, standard deviation.

*P value is reported first followed by *P* value covaried for depression.