



## Case Reports

# Diagnosing Functional Neurological Disorder through History and Physical Examination: A Case Report

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## Abstract

Differentiating between stroke and stroke mimics (i.e., non-vascular conditions) is a major challenge, as they often involve similar presenting symptoms. A common type of stroke mimic is functional neurological disorder (FND), a somatic disorder caused by severe stress, emotional conflict, or a psychiatric disorder usually presenting with one or more neurologic symptoms. This condition is associated with voluntary motor and sensory symptoms that are internally inconsistent with identifiable neurological diseases and lack structural lesions. We describe a 54-year-old female with a history of transient ischemic attack resulting in bilateral blindness and recent social stressors, who presented with right-sided facial and extremity motor and sensory deficits, bilateral diplopia, and dysphagia. Her left upper and lower extremities had 2 out of 5 motor strength, a weak hand squeeze, and a positive Babinski reflex on the contralateral side of her weakness, which resolved the next day. In addition, decreased sensation to light touch and temperature over the right arm and leg were appreciated without a dermatomal pattern. Given the negative stroke work-up, atypical physical exam findings, prior history of blindness, and in the setting of recent psychological stressors, her acute motor and sensory deficits were diagnosed as FND after evaluation by the Neurology service. The current case demonstrates the following important features of making a FND diagnosis: 1) careful history taking in eliciting potential psychological stressors; 2) a comprehensive neurological examination assessing the presence of findings specific for FND (e.g., greater weakness with active rather than passive movements, fluctuating weakness); 3) multidisciplinary collaboration with neurology and psychiatry providers to aid in performing a comprehensive assessment.

## BACKGROUND

Motor and sensory neurological symptoms commonly result in emergency room visits and acute hospitalizations, and providers must quickly and accurately determine if the patient is having a stroke to guide treatment. Differentiating between stroke and stroke mimics (i.e. non-vascular conditions) is a major challenge, as they often involve similar presenting symptoms. Limb weakness, numbness and sensory disturbances, which are typically lateralized, are reported symptoms in about 70% of all stroke mimics.<sup>1-3</sup> A common type of stroke mimic is functional neurological disorder (FND), previously known as psychogenic or conversion disorder. The diagnostic criteria for FND have fundamentally changed with the last revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), replacing what was a principle of exclusion with a diagnosis supported by specific clinical signs and thorough history-taking.<sup>4,5</sup> FND is defined as having the following: one or more symptoms of altered

voluntary motor or sensory function; evidence of incompatibility between the symptom and neurological or medical conditions; a symptom not better explained by another medical or mental disorder; symptoms causing clinically significant distress or impairment in areas of functioning or warranting medical evaluation.<sup>4,5</sup>

There is often, but not always, a previous history of seizures, migraine, depression or other psychiatric disorders or dementia. Studies have also identified that physical exam findings, demonstrating inconsistency and reversibility, often suggest a FND diagnosis.<sup>5</sup> For instance, Hoover's sign, weakness of voluntary hip extension with normal involuntary hip extension during contralateral hip flexion against resistance, is a finding that has a 67-100% positive predictive value for FND.<sup>6</sup> In further support of positive physical exam findings, Edwards et al. demonstrated that conscious movements, where a patient was asked to think about and perform a maneuver, were affected more so than unconscious ones in FND.<sup>6</sup> The current case demonstrates the importance of careful his-

tory taking and conducting a thorough neurological examination to make an accurate diagnosis of FND.

## CASE PRESENTATION

A 54-year-old female with a complicated past medical history of Bell's Palsy at 18 years old, two prior transient ischemic attacks (TIAs), coronary artery disease (CAD) and a history of migraines presented with right-sided facial and extremity motor and sensory deficits, bilateral diplopia, and dysphagia that began 18 hours prior. She was initially admitted to the inpatient team as a Code Stroke with an NIH Stroke Scale (NIHSS) of 12. Given her presenting symptoms and history of TIAs and CAD, a computed tomography emergent large vessel occlusion (CT ELVO) study was performed yielding unremarkable results, and her magnetic resonance imaging (MRI) brain scan showed no evidence of an acute infarct. She was not a candidate for tissue plasminogen activator (tPA) as she presented outside of the tPA window.

The patient had a recent hospitalization for a TIA 8 months ago and had a catheterization with drug-eluting stent (DES) placement. In addition to a TIA, the patient also had bilateral blindness for 4 months which gradually resolved. Further assessment of the patient revealed that she had recently moved from another state and was experiencing significant social stressors with family in her new living environment.

On her physical exam, the patient was alert and oriented to person, place, and time. No visual deficits were identified. She had a right facial droop but retained the ability to furrow her brow on the ipsilateral side. Her left upper extremity had 2 out of 5 motor strength with a weak hand squeeze. Her right lower extremity had 2 out of 5 motor strength. Decreased sensation to light touch and temperature over the right arm and leg were appreciated without a dermatomal pattern. The patient had 2+ bilateral bicep, brachioradialis, triceps and patellar reflexes. While an initial exam by a provider reported a positive babinski reflex on the contralateral left side, this exam finding was not elicited on subsequent exams by other providers during the duration of this patient's hospital stay. The rest of her physical exam was unremarkable. The patient's blood biochemistry, thyroid, troponin, and toxicology studies demonstrated no significant findings.

Given the negative stroke work-up, atypical physical exam findings, prior history of intermittent blindness, and in the setting of recent psychological stressors, her acute motor and sensory deficits were diagnosed as FND after evaluation by Neurology service. Additionally, her improved weakness and preserved reflexes on her neurological examinations argue against acute inflammatory demyelinating polyradiculopathy (AIDP). The patient was reassured that having FND is common and treatable and that she has the potential for complete recovery. The patient was advised to rest, reduce daily stress levels, and

was provided an explanation of FND. Her motor and sensory deficits improved slowly and incrementally each day. She declined psychiatric evaluation or discharge with rehabilitation.

## DISCUSSION

Functional neurological disorder (FND) is a common and disabling condition, with a prevalence of 50 per 100,000 people and 4 to 5 per 100,000 population per year, specifically for motor FND.<sup>7</sup> Diagnosing and treating patients with FND can be challenging as they present similarly to stroke and other structural neurological disorders. To establish a diagnosis, initiate acute treatment, and develop discharge plans for adults with FND, clinicians must obtain careful medical and family histories, psychiatric and psychosocial screenings, and a comprehensive neurological examination assessing the presence of findings specific to FND. This is often accomplished through multidisciplinary collaboration with neurology and psychiatry providers to aid in performing a comprehensive assessment.

The current recommendation on FND is to approach the diagnosis as a process of ruling in FND rather than simply ruling out other conditions. The diagnosis is primarily a clinical one based on the history and positive physical examination findings specific to FND.<sup>8</sup> For instance, the patient had fluctuating right-sided extremity weakness that improved but then would revert to her baseline presentation. In addition, she demonstrated greater weakness in her right upper extremity with active rather than passive movements and had varying levels of resistance to strength testing. The patient's inconsistencies and atypical neurological physical examination findings were instrumental in elucidating a diagnosis of FND and ruling out structural neurological disorders.

Prior studies have identified physical exam signs as helpful in making an FND diagnosis. Hoover's sign is hip flexion and extension testing, which reveals inconsistency in attended versus unattended movement in the affected leg (67-100% positive predictive value (PPV)).<sup>9</sup> Hip abduction testing reveals inconsistency in attended versus unattended movement in affected and unaffected legs with 100% PPV.<sup>9</sup> Moreover, functional motor disorders of the face are generally easy to distinguish from facial symptoms of a stroke. The unilateral lip-pulling sign reveals a characteristic functional dystonic movement disorder of the face that may give a superficial appearance of weakness but is caused by overactivity, typically of platysma or the muscles of jaw deviation. Downward drift with pronation indicates cortical weakness, whereas drift without pronation is typical in patients with functional arm weakness.<sup>9</sup> Diagnosis based solely on psychosocial factors, psychiatric comorbidity, or negative imaging is inadequate to diagnose FND.

Extensive testing for FND is generally not indicated as it reinforces anxiety, is needlessly expensive and increases the risk of iatrogenic harm due to incidental findings. Emergency MRI with diffusion-weighted imaging (DWI) can be used to visualize ischemic brain damage. However, according to a recent meta-analysis, about 7% of acute ischemic stroke cases have no detectable DWI lesions.<sup>10</sup> The role of neuroimaging can only support but not prove the diagnosis of FND, and it can detect an acute infarction but cannot exclude it with absolute certainty.<sup>10,11</sup>

A comprehensive screening of psychiatric risk factors and psychosocial stressors should be conducted early to identify predisposing, precipitating, and perpetuating factors that can potentially lead providers to an FND diagnosis. Through careful history taking, the patient's disclosure of recent environmental stressors and history of resolving blindness helped solidify the diagnosis of FND. However, it is important to note that a history of trauma or psychiatric risk factors is not necessary to diagnose a patient with FND. Research has failed to demonstrate a consistent link between traumatic experiences, psychiatric disorders, and FND. Therefore, while the presence of psychosocial risk factors, history of mental health disorders, or trauma cannot definitively direct a clinician to a diagnosis of FND, it is supportive in conjunction with positive signs of FND on physical exam.

Once a diagnosis is made, the provider should be careful to discuss FND with the patient nonjudgmentally.<sup>1</sup> For example, clinicians can make clear that the loss of motor control or sensation results from abnormal brain processing rather than structural damage. There is a balance of assuring the patient that their symptoms are reversible and that their physiological function is preserved, while also acknowledging the validity of their symptoms. Clinicians can report to their patients the absence of findings on diagnostic tests and imaging. In addition, it is important to carefully explain the term "psychogenic", so the patient does not misinterpret it to imply that he or she is feigning or malingering, which is a separate condition differentiated by intentionally produced symptoms.<sup>8</sup>

Treatment options for FND include limiting "hands-on" treatment, fostering adaptive motor function, redirecting attention, using sequential learning, gradually eliminating external supports, and encouraging self-management.<sup>12,13</sup> Several studies have documented the effec-

tiveness of physical therapy (PT) and occupational therapy (OT) in using principles to guide independent activities of daily functioning and living.<sup>5</sup> Cognitive behavioral therapy (CBT) is another critical component of treatment that focuses on the role that cognition and behavior play in sustaining FND through maladaptive automatic thoughts, misinterpretation of sensory input, and illness beliefs.<sup>5</sup> Interventions through CBT include education, stress management techniques, the development of new behavioral responses, and helping patients identify and replace thought patterns that reinforce symptoms.<sup>5,12,13</sup> In conclusion, the current case demonstrates the difficulty in establishing a diagnosis of FND when the presenting symptoms are similar to a stroke. However, emphasizing the importance of the history and physical examination findings over extensive diagnostic testing is essential in accurately diagnosing FND.

## Disclosures/Conflicts of Interest

The authors have no conflicts of interest to disclose.

## Author Contribution

All Authors have reviewed the final manuscript prior to submission. All the authors have contributed significantly to the manuscript, per the ICJME criteria of authorship.

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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