

### Ten myths about functional neurological disorder

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### Introduction

Functional neurological disorder (FND) is the second most common reason for referral to a neurologist. Despite being potentially treatable, FND remains underdiagnosed and associated with high levels of disability and distress. In this article, 10 common myths about FND that continue to obstruct the diagnosis and treatment for these

patients are addressed and are presented with accompanying lessons for the clinician.

### Myth 1: FND is a diagnosis of exclusion

The diagnosis of FND should be approached in the same way as other medical conditions and be diagnosed using positive features, rather than by ruling out other conditions [1]. Positive signs on examination include Hoover's sign of functional limb weakness, where hip extension weakness returns to normal when attention is diverted to the contralateral leg. Functional tremor may 'entrain' to the frequency of imposed rhythmic movements in another body part. Functional (dissociative) seizures can be recognized by a combination of typical features such as eyes tightly closed during an episode, long duration, or awareness of generalized shaking. Thus, the diagnosis of FND should be based primarily on typical features only seen in this disorder or internal inconsistency of the symptoms and signs [2].

*Lesson:* The diagnosis of FND should be 'ruled in' based on the presence of positive signs.

### Myth 2: Patients have either FND or another neurological disorder

The presence of another neurological condition is a powerful risk factor for the development of FND and they commonly occur together. Physical injury, surgical procedures and migraine often precipitate functional movements in vulnerable individuals, and up to 20% of patients with functional (dissociative) seizures also have epilepsy [3]. Some conditions like Parkinson's disease appear particularly likely to present with comorbid FND, perhaps because of shared neurobiology, but symptoms and disability from any neurological condition may be sufficient. For this reason, there should be a low threshold for investigations.

*Lesson:* FND commonly co-occurs with other neurological disorders.

### Myth 3: A bizarre presentation indicates FND

Functional neurological disorder is frequently equated to bizarre or unrecognizable clinical neurological presentations, such as complex movement disorders. In fact, several genetic or acquired movement disorders present with strikingly bizarre phenomenology [4–6]. In such cases, the 'bizarreness' is not the key to the diagnosis, but rather the bizarre pattern remains consistently present, despite variations in task performance or with distraction. Conversely, the key to recognizing FND is the variability of the symptoms and signs across different situations over time and within the physical examination itself. In addition, in the case of functional movement disorders, the movements are not inherently more bizarre, they just abide by their own rules, and therefore can also produce recognizable phenotypes. For example, functional facial dystonia is remarkably identical amongst patients [7].

*Lesson:* A bizarre presentation does not equate to a diagnosis of FND.

### Myth 4: Different phenotypes of FND indicate different disorders

Various presentations of FND are commonly defined as the functional correlates of known neurological signs, e.g. a functional tremor, dystonia, seizures etc. However, given the shared risk factors amongst patients with FND, it is more likely that these different phenotypes represent a variable expression of the same underlying disorder (FND), manifesting differently in different individuals. FND is often accompanied by the presence of pain, fatigue, cognitive symptoms and/or other systemic functional symptoms. Recognizing this broader FND syndrome can be helpful diagnostically in challenging cases, particularly in complex presentations that do not neatly conform to known phenotypes.

*Lesson:* Functional symptoms are often part of a broader FND syndrome including pain, fatigue and cognitive symptoms.

### Myth 5: FND symptoms are voluntary

Functional neurological disorder symptoms do arise from the voluntary nervous system which is one reason why concerns about exaggeration or malingering persist in many doctors' minds when thinking about FND. Multiple convergent evidence suggests that feigning is a highly improbable reason for these symptoms including studies showing dysfunction of brain regions involved in movement planning, attention, body monitoring and sense of agency in patients with FND, in contrast to observations in experimental feigning [14,17,18]. Neurophysiological studies, differential recovery in randomized trials, and consistent presentations and comorbidities across cultures and across time are all supportive of FND as a distinct clinical brain disorder and not a result of voluntary feigning of symptoms.

*Lesson:* FND symptoms are involuntary; patients are not 'putting them on' and feigning is rare.

### Myth 6: There is no role for investigations in the diagnosis of FND

Having a low threshold for investigations is important because additional neurological disease, such as radiculopathy or demyelination, is such a strong risk factor for FND. Care must be taken in explaining to patients why investigations are being done and to prepare the patient for potentially incidental findings. Laboratory-supported criteria can also be helpful in difficult cases, such as the presence of a cortical *Bereitschaftspotential* in functional myoclonus which suggests use of self-initiated movement pathways.

Electromyography can be useful in detecting positive signs such as coherence, distractibility or entrainment in functional tremor, which can then be demonstrated to the patient. Video electroencephalography is helpful in differentiating epileptic and functional (dissociative) seizures. Ideally, the FND diagnosis is presented before the outcome of the investigations to highlight that it is a 'rule-in' diagnosis.

*Lesson:* Investigations can be useful to identify comorbid neurological conditions, diagnose phenotypically

challenging cases and reinforce positive signs to the patient.

### Myth 7: There is less harm in missing a diagnosis of FND than missing another neurological disease

There is often the perception that it is worse to miss a diagnosis of another neurological disease than a functional disorder. Published frequencies of misdiagnosing FND have been consistently around 4% from the early 1970s to 2005, similar to other neurological and psychiatric disorders, with even lower rates in more recent studies [8]. To put this into perspective, the rate of misdiagnosis of Parkinson's disease in tertiary centres is approximately 25%, at least upon the initial contact [9,10]. It is appropriate to be concerned about missing any diagnosis, particularly in young and disabled patients, and especially when the illness is potentially treatable like FND. Misdiagnosis of patients with FND with diseases such as multiple sclerosis occurs just as commonly and can lead to just as much harm [11,12].

*Lesson:* FND is not misdiagnosed more than other conditions. Erroneously diagnosing FND as another neurological condition can be as harmful as the reverse.

### Myth 8: FND is exclusively a psychological problem caused by psychological factors

For much of the 20th century, Freud's conversion hypothesis – that FND arises from a psychological conflict converted into physical symptoms – has been dominant. More recent work shows that a history of adverse life experience and psychological comorbidities are commonly seen in this population, but they do not occur in all patients, and even when present may not be relevant [13]. This is now reflected in the DSM-5 diagnostic criteria which no longer require the patient to have a psychological stressor [14]. In addition, psychological/psychiatric comorbidities are also common in other neurological disorders [15–17]. Just as hypertension and smoking are risk factors for stroke, disease comorbidity, health anxiety and stress are risk factors for FND. FND is a complex and heterogeneous disorder, with multiple

potential biological and psychological causes and mechanisms that vary hugely between patients and which challenge conventional dualistic assumptions about the brain and mind.

*Lesson:* Psychological factors are one of many possible risk factors for FND and should not be considered the sole aetiological cause.

### Myth 9: The prognosis of FND is usually good

There tends to be a perception that in FND 'nothing is wrong' or that, with treatment, all patients ought to improve. As in any neurological condition, there is a spectrum of disease severity treatment response but many studies show the majority of patients being the same or worse at follow-up [8]. Patients with FND have levels of disability and impairment in quality of life similar to those with similar debilitating conditions such as Parkinson's disease or epilepsy [18], which commonly include chronic pain, fatigue, cognitive problems and psychological comorbidity.

*Lesson:* Patients with FND are as disabled and have as impaired a quality of life as patients with other neurological conditions. When left untreated, prognosis is unfavourable for most.

### Myth 10: The treatment of FND is solely referral to a psychologist or psychiatrist

Functional neurological disorder patients require individualized treatment, beginning with a transparent and carefully explained diagnosis. This should avoid simply telling the patient what they do not have or jumping to conclusions about aetiology. Demonstration of positive signs to the patient can alter fundamental views about the nature and potential reversibility of the condition. As in other neurological conditions, a multidisciplinary approach is often required for more complex cases [1]. Physical therapy alone is effective in some patients with functional movement disorders and has promising early data from randomized trials, even in patients with long-duration symptoms [19]. There is an evidence base for psychological therapy in functional (dissociative) seizures [20], which may also be essential when anxiety, mood or personality

disorders are comorbid. Identifying and triaging patients with dominant pain or fatigue syndromes is important, as these may need to be the initial focus of treatment. In some severe cases, the main treatment focus may be on support and prevention of iatrogenic harm from unnecessary medication or interventions.

*Lesson:* FND treatment is individualized and involves careful explanation combinations of physical and psychological rehabilitation.

## Conclusion

Functional neurological disorder is a common condition, lying at the interface of neurology and psychiatry. A clear diagnosis delivered in a timely manner can have a strong positive impact on the patient's symptoms, prognosis and quality of life. Patients can improve with individualized, multidisciplinary treatment. Attitudes and practices are changing but the many misconceptions that surround FND continue to obstruct good medical care for these patients.

## Disclosure of conflicts of interest

The authors declare no financial or other conflicts of interest.

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