Functional Neurological Disorder

Laura Boyle, Neuro Rehab Dietitian, Nutrition and Dietetic Department, St George's University Hospitals NHS Foundation Trust, London, UK
Email: laura.boyle2@nhs.net

A functional neurological disorder (FND) encompasses a range of physical and neurological symptoms not explained by traditional diagnostics, such as magnetic resonance imaging (MRI).[1, 2] Patients will often present with symptoms (**Figure 1**) similar to well-characterised neurological conditions, such as motor neurone disease, stroke[3] and epilepsy. These symptoms are disabling[4] and can result in significant patient distress.[4] As well as physical distress, there can be substantial individual, family, social and economic burdens, as symptoms can lead to difficulties in maintaining employment.[5] Due to similarities with other neurological conditions, multiple tests need to be performed to enable a diagnosis. Yet, despite positive symptoms, these tests may come back as normal which further helps lead to a FND diagnosis. Whilst there is a lack of understanding regarding the aetiology of an FND,[6] it can be classified using the Diagnostic and Statistical Manual of Mental Disorders (DSM–5).[7]

The aetiology of a FND is still being explored,[8] but it is currently hypothesised to be multifactorial, including stress, environmental and genetic susceptibility.[9] Approximately two out of three patients with a FND also have an emotional disorder[10] – i.e. anxiety, depression – and, historically, it was part of the FND diagnosis criteria. However, these psychological factors have been removed in the most recent diagnostic guidelines as FND's can occur without any emotional stressors.[4]

Incidence rates of FND's are 4-12 per 100,000[11] and neurology clinic data suggests that a FND is the second most commonly diagnosed condition.[12] It has been found to be more prevalent in women than men and peaks between the ages 35-50.[13-18] However, this data is reported from clinics and it is known that women are more likely to present to health services.[4] FND's have also been characterised in young children and the elderly, therefore this condition is widespread amongst all age groups.[4]

Queen Mary's Hospital (QMH) in Roehampton offers inpatient beds to treat FND's. In terms of physical recovery from a FND, the gold standard is a multidisciplinary team (MDT) environment.[25] Research currently supports the input of physiotherapists[25] and psychologists,[26] and a recently published review also highlights the potential benefit and importance of speech and language therapists in FND's.[27] Currently there is no research or literature to support the input of dietitians.

Figure 1: Symptoms[16, 19, 20-22] and Co-morbidities in FND's[4, 17, 20, 23, 24]

- Dissociative seizures
- Dissociation
- Functional tremor
- Functional dystonia
- Body weakness and numbness
- Gait difficulties
- Pain
- Fatigue
- Anxiety
- Depression
- Myoclonus

QMH designates four beds to patients with a FND, who can remain inpatients for up to 12 weeks. They have access to an MDT consisting of: consultant neuropsychiatrist, psychologist, physiotherapist, occupational therapist, dietitian, specialist nurses and activity coordinators. As mentioned, currently there is no evidence-based literature on the nutrition status of patients with a FND or the role of a dietitian in the rehabilitation of FND's. Support websites for this patient group are available and highlight the benefits of nutrition. One website[28] that supports this patient group highlights the importance of nutrition; however, the evidence behind the advice is unclear. To demonstrate the role of a dietitian in the rehab process for FND's, the final part of this article will present a FND patient case study.

Case study – Mr N

Background

Mr N* was a 43-year-old man who had a 12-year history of spasms, speech difficulties and seizure-like episodes. His magnetic resonance imaging (MRI), electroencephalogram (EEG), nerve conduction studies, serological test and electromyography were all within normal limits despite having these on-going symptoms. He was admitted to QMH for 10 weeks to focus on improving his spasms and mobility. The spasms began without an obvious trigger and affected his ability to eat as he was unable to hold a knife or fork for a prolonged period of time. In the private environment of his home he was able to eat despite the spasms due to having a longer time to eat and was able to have regular snacks and thus his weight remained stable. However, at QMH in the company of other patients he found the spasms during meals embarrassing. This resulted in him leaving meals prematurely despite still feeling hungry.

The main dietetic challenge was Mr N found that his spasms increased at mealtimes since commencing the rehabilitation programme. This was in addition to him having less time to eat and snack during the day due to a full timetable. Overall this led to Mr N having a reduced oral intake and subsequently losing weight (see **Table 1**).

Dietetic intervention

To gain an understanding of the challenge that Mr N faced during mealtimes, he recorded how many times he dropped his cutlery versus how much of his meal he ate for three meals a day. On average, he was dropping his cutlery 2-3 times per meal; in a given week he managed to eat 100% of breakfast but 0-50% of subsequent meals with the average being 0-30% resulting in a calorie deficit (see **Table 2**). He had a good appetite and was therefore determined to improve his oral nutritional intake and he attempted to do so for the first part of his rehab admission. Despite this and the MDT efforts (arm support, fatigue management, adapted cutlery, etc.), it was agreed between the dietitian and the patient that a compact oral nutritional supplement (ONS) was needed. It was prescribed for twice a day initially, however, on review, he was only consuming one a day as he still hoped he would be able to increase his dietary intake through food. His weight had declined by 10% by week eight of his admission and, due to this, he agreed that having three supplements a day was appropriate. On the third review, further strategies were put in place to increase his intake, such as having more rest time and smaller meals and snacks to help make mealtimes less intimidating. To further support reducing the speed of weight loss, a shot-based high calorie ONS was suggested, however the patient declined. Despite all efforts, Mr N had a total of 13% weight loss during his 10-week inpatient stay. Upon discharge, he was referred to the community dietitians and an ONS prescription was requested via his GP. Due to his significant weight loss and a potentially long waiting list to be seen by a community dietitian, Mr N was called for an update one week after his discharge. His oral intake had not improved and he had lost further weight, which was then fed back to the community dietitians. See **Table 3** for a summary.

Discussion

This patient raised the challenge of balancing patient-led decisions *versus* professional recommendations. Despite explaining that his seizures were using a large amount of energy in addition to adversely impacting his oral intake, the patient always felt he could overcome dropping his cutlery and that needing supplements resulted in him feeling defeated by his FND. Whilst the outcome of this case remains unknown, this is a key example of FND symptoms adversely affecting nutritional intake.

Table 1: Patient Summary

Patient Name	Mr N
Reason for referral	'Poor oral intake' 6 weeks into admission
Admission length	10 weeks
Admission weight	83.9 kg
Discharge weight	73 kg
Height	1.85 m
Admission BMI	23.9 kg/m^2
Discharge BMI	21.4 kg/m^2
Percentage weight loss during admission	13%

Table 2: Requirements *vs.* Nutritional Intake Snapshot

Week no.	Requirements		Intake	
	Energy (kcal)	Protein (g)	Energy (kcal)	Protein (g)
7	2125	62-78	700	25

Table 3: Events Timeline from Referral

Week 6	• Patent referred • 4% weight loss had occurred since admission • Strategies suggested to improve eating experience: Use a straw/beaker, cut food up (patient was not keen) • Food fortification discussed and patient motivated to increase intake • Patient to fill out form indicating amount cutlery dropped *vs.* amount of meal eaten
Week 7	• 7% weight loss occurred since admission • ONS started twice a day
Week 8	• 10.5% weight loss occurred • Patient reported only having one supplement a day • Encouraged patient to have a sandwich before bed (cut up to assist with eating and spasms) • Patient reluctant to increase ONS to three times a day. Agreed if weight hadn't stabilised by next review to increase prescription • Extra breaks added to the patient's timetable to reduce fatigue which led to increased spasms and thus reduced intake
Week 10	• 13% weight loss since admission • Increased ONS to three times a day • Spoke about referral to community dietetics; patient feels he will be able to maintain his weight post discharge however agreed he needed a referral to help get back to his baseline weight • High calorie/fat 30 ml shot-based ONS suggested but patient declined
1 week after discharge	• Called patient and had lost further weight • Reassured had referred to the community and to continue with the supplements and food fortification advice

In summary

The patient case study presented in this article focuses on nutrition support, other patients' referrals have included: irritable bowel syndrome, high sugar/caffeine diets, weight management, emotional eating and irregular meal patterns. Our observations also show that it is also becoming increasingly prevalent for patients to present with an eating disorder. However, this is purely a clinical observation based upon one rehabilitation centre and needs to be studied on a wider scale to establish the key nutritional themes amongst a wider number of FND patients. More research is also needed to evaluate the overall input of a dietitian in the FND multidisciplinary team. However, multiple patient case studies have identified to the team that starting the rehabilitation journey has been a catalyst for dietary behaviour change. This provides an ideal opportunity for a dietitian to be involved in this process if not already.

Working with this patient group is a rewarding role, especially in the rehabilitation setting where it is possible to build a strong patient-dietitian relationship. Each patient's unique FND symptoms, support network, food beliefs and habits lead to this condition creating an interesting dietetic caseload. Having a set period of time, weekly sessions, a strong MDT, a positive patient-dietitian relationship, and a collaborative approach, helps to sustain a patient's motivation to achieve their long-term dietetic rehab goals.

Key points:

1. Always trust the symptoms that the patient is presenting with are real.
2. Explore how having FND symptoms has affected their everyday life and thus their nutritional intake, i.e. routine, fatigue, mood, excess sleep, caffeine intake, etc.
3. Explore the patient's beliefs regarding nutrition and impact on FND symptoms.

Helpful websites: • www.fndhope.org • www.fndaction.org.uk

References: **1.** Hallett M (2016). Neurophysiologic studies of functional neurologic disorders. Handbook of Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p80-90. **2.** Aybek S, Vuilleumier P (2016). Imaging studies of functional neurologic disorder. Handbook of Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p92-103. **3.** Vroomen P, et al. (2008). The incidence of stroke mimics among stroke department admissions in relation to age group. J Stroke Cerebrovasc Dis.; 17(6): 418-422. **4.** Lehn A, Carson A (2016). Epidemiology. Handbook of Clinical Neurology: Functional Neurological Disorders. 3rd ed. Elsevier; p65-77. **5.** Rask M, Rosendale M, Fenger-Gron Mea (2015). Sick leave and work disability in primary care patients with recent-onset multiple medically unexplained symptoms and persistent somatoform disorders: a 10 year follow-up of the FIP study. Gen Hosp Psychiatry; 37(1): 53-59. **6.** Carson A, Ludwig L, Welch K (2016). Psychologic theories in functional neurological disorder. In Handbook for Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p124-139. **7.** American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Association. **8.** Frodl T (2016). Do (epi)genetics impact the brain in functional neurological disorders? Handbook for Clinical Neurology: Functional Neurologic Disorders.: Elsevier; p176-184. **9.** Krem M (2004). Motor conversion disorders reviewed from a neuropsychiatric perspective. J Clin Psychiatry.; 65(6): 783-790. **10.** Carson A, Hallett M, Stone J (2016). Assessment of patients with functional neuroligic disorders. In Handbook for Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p169-188. **11.** Carson A LA (2016). Epidemiology. In Handbook for Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p47-60. **12.** Stone J, et al. (2010). Who is referred to neurology clinincs? - the diagnoses made in 3781 new patients. Clin Neurol Neurosurg.; 112(9): 747-751. **13.** Monday K, Jankovic J (1993). Psychogenic Myoclonus. Neurology; 43(2): 349-352. **14.** Lang A (1995). Psychogenic dystonia: a review of 18 cases. Can J Neurol Sci.; 22(2): 136-143. **15.** Williams D, Ford B, Fahn S (1995). Phenomenology and psychopathology related to psychogenic movement disorders. Adv Neurol.; 65: 231-257. **16.** Kim Y, Pakiam A, Lang A (1999). Historical and clinical features of psyogenic tremor: a review of 70 cases. Can J Neurol Sci.; 26(3): 190-195. **17.** Feinstein A, Stergiopoulos V, Fine Jea (2001). Psychiatric outcome in patients with a psychogenic movement disorder: a prospective study. Neuropsychiatry Neuropsychol Behav Neurol.; 14(3): 540-548. **18.** Thomas M, Vuong K, Jankovic J (2006). Long-term prognosis of patients with psychogenic movement disorders. Parkinsonism Relat Disord.; 12(6): 382-387. **19.** Koller W, Lang A, Vetere-Overfield Bea (1989). Psysogenic Tremors. Neurology; 39(8): 1094-1099. **20.** Carson A, Ringbauer B, Stone Jea (2000). Do medically unexplained symptoms matter? A prospective cohort study of 300 new referrals to neurology outpatients clinics. J Neurol Neurosurg Psychiatry.; 68(2): 207-210. **21.** Hallett M (2010). Physiology of psychogenic movement disorders. J Clin Neurosci.; 17(8): 959-965. **22.** Brown R (2016). Dissociation and functional neurological disorders. In Hallett M, Stone J, Carson A, editors. Handbook of clinical neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; 104 - 113. **23.** Carson A, Stone J, Hibberd Cea (2011). Disability, distress and unexployment in neurology outpatients with symptoms 'unexplained by disease'. J Neurol Neurosurg Psychiatry; 82: 810-813. **24.** Crimlisk H, Bhatia K, Cope Hea (1998). Slater revisited: 6 year follow up study of patients with medically unexplained motor symptoms. BMJ; 316(7131): 582-586. **25.** Nielsen G (2016). Physical treatment of functional neurologic disorders. In Handbook for Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p 554 - 569. **26.** Goldstein LH, Mellers JDC (2016). Psychologic treatment of functional neurologic disorders. In Handbook for Clinical Neurology: Functional Neurologic Disorders. 3rd ed. Elsevier; p 571-583 **27.** Barnett C, Armes J, Smith C (2018). Speech, language and swallowing impairments in fuctional neuroligical disorder: a scoping review. Int J Lang Commun Disord.; 54(3): 309-320. **28.** FND Hope (2019). Healthy Living: Nutrition. Accessed online: https://fndhope.org/living-fnd/healthy-living/nutrition/ (Jun 2019).

*Patient name changed to protect patient confidentiality.