*Article*

*Pain and Rehabilitation*
Volume 55 2025

# Presentations of Functional Neurological Symptoms following orthopaedic surgery: a retrospective case series

**Lucy Fraser[1], Rokhsaneh Tehrany[1], Gregory Booth[1,2]**
[1]*Therapies Department, Royal National Orthopaedic Hospital NHS Trust.*
[2]*Population Health Research Institute, School of Health and Medical Sciences, City St. George's, University of London.*

**Abstract**
**Background:** This case series aimed to describe the characteristics and symptomatic profile of patients presenting with symptoms of Functional Neurological Disorder (FND) following orthopaedic surgery and explore their impact on clinical services.
**Methods:** This retrospective case series evaluated data from hospital clinical records of adult inpatients who presented with FND symptoms following orthopaedic surgery. Data were analysed narratively and using descriptive statistics.
**Results:** Five patients were included; four were female with an age range of 41 to 57 years. All five had a history of chronic pain and deteriorating mobility and three had a mental health disorder. Four patients had undergone spinal surgery and four exhibited functional motor symptoms. Length of admission ranged from 14 to 171 days and only two patients received a formal diagnosis during their inpatient stay. No local FND-specific services were available to any patients on discharge.
**Conclusions:** All patients with suspected FND symptoms had extended lengths of admission, which may arise from absent pre-established management pathways. Potential barriers to diagnosis may include complex clinical presentations, lack of established diagnostic pathways and a limited awareness of FND. Future research is warranted to standardise screening and management pathways within the acute orthopaedic setting.

**Keywords**
Functional Neurological Disorder; Orthopaedic Surgery; Management.

## Introduction

### *Background*

Functional Neurological Disorder (FND) (formerly known as 'Conversion Disorder') is a poorly understood condition, which broadly describes conditions arising from a disorder of the nervous system function, rather than a clearly identifiable pathophysiological disease (1). Global community incidence rates of FND are estimated between 4-12 per 100 000 per annum (2), and FND is the second most common condition seen in outpatient neurology clinics, accounting for approximately 6% of outpatient neurology contacts worldwide (3).

FND places substantial impact on quality of life; levels of distress and disability have been shown to be similar to that of Multiple Sclerosis based on outcomes from the SF-36 health status questionnaire (4).

**Corresponding author:**
*Lucy Fraser. Therapies Department, Royal National Orthopaedic Hospital NHS Trust, Lucy.Fraser13@nhs.net*

Patients with FND have high rates of hospitalisation and undergo extensive medical investigations (5). This may arise due to the characteristically heterogenous presentation of FND, which includes a spectrum of clinical signs and symptoms including (but not limited to) paralysis, tremor, dystonia, sensory disturbance (including visual loss), speech symptoms, and seizures (6). As such, symptoms are commonly mis-interpreted as stroke or epilepsy, placing high demand on emergency services (7).

Due to the complex and varied nature of FND (8), the diagnosis and onward management is often delayed, with one study reporting over half of patients newly diagnosed with FND within an Australian hospital did not have their diagnosis communicated to them (5). Indeed, data shows that patients wait an average of 6.63 years from symptom onset to diagnosis (9), and that patients' needs are not understood by consultants, other hospital-based healthcare staff and general practitioners (10). These delays can have huge financial implications for health services; an Italian study calculated this as 2,302 euros per patient, per

year of delayed diagnosis (9). Better understanding of the condition in terms of identification of signs and symptoms is therefore required, particularly within non-specialist neurological settings.

Current evidence shows that physical and emotional stressors can trigger symptoms of FND (11) causing abnormal involuntary brain-generated predictions about bodily states and interference from more emotionally orientated brain networks, such as the limbic system and amygdala (11). This current model explains how symptoms could be triggered by trauma, such as physical injury, chronic pain or surgery (12). Evidence also shows that FND is more common amongst patients with chronic pain (13) and a recent systematic review highlights that feelings of panic and vulnerability provoked by anaesthesia may precipitate the development of FND symptoms (14).

Although FND is typically identified and managed within neurological settings, there is emerging evidence documenting the presentation of post-operative FND symptoms in orthopaedic settings, particularly following spinal surgery (15)(16)(17). FND symptoms observed in these studies include functional visual loss (15) and functional motor and sensory deficits (16)(17). These studies concluded that awareness of FND was necessary in the orthopaedic environment, particularly within neurosurgery (e.g. spinal fusion) where there may be overlap with structural neurological pathology. However, these findings are limited to single case reports.

Case series allow comparison between multiple cases, which enables a greater understanding of potential similarities and differences of the characteristics and management of the condition of interest, particularly in the case of rare conditions or atypical settings (18). This case series aimed to document and describe the characteristics and symptomatic profile of post-operative patients presenting with suspected FND symptoms following orthopaedic surgery in order to: a) explore the personal impact, and b) explore the implications for the inpatient service and potential barriers to diagnosis.

**Methods**

This retrospective case series was based within an orthopaedic hospital within the UK, providing care for people with complex musculoskeletal conditions. A retrospective analysis of anonymised eligible patient data obtained from the hospital electronic clinical records was carried out over a one-year period between June 2022 and June 2023. The study proposal was assessed by the hospital's Research and Development (R&D) department and was subsequently categorised as a service evaluation, with written approval to review anonymised, retrospective patient data obtained on the 29th of June 2023 (SE23/014). This study has been reported in line with the guidelines for writing Case Reports (19).

*Patient Eligibility Criteria*

All patients included in this case series had undergone orthopaedic surgery (e.g. joint arthroplasty) or an invasive procedure (e.g. spinal injection) between June 2022 and June 2023 and had a subsequent diagnosis, or clinically relevant signs and symptoms of FND following the procedure. While a proportion of patients did not receive a formal diagnosis of FND during their admission, it was considered important to also include patients who were not provided with a formal diagnosis *per se*, as this information reflected the challenges the study aimed to address.

*Inclusion criteria:*

1. Adult inpatients who presented with symptoms of FND (e.g., functional seizures, functional tremor or myoclonus) following orthopaedic surgery (e.g., spinal deformity correction or peri-acetabular osteotomy), or procedure (e.g. spinal nerve root block). These symptoms were defined as any 'new symptoms that were internally inconsistent or incongruent with recognised pathophysiological disease' (1).
2. Adult inpatients who were provided with a formal diagnosis of FND associated with their admission.

*Exclusion Criteria:*

1. Pre-existing diagnosis of FND
2. Under the age of 18
3. The presence of another pathophysiological explanation for the presenting symptoms, for example pain or nerve root compression.

*Data Collection*

Two authors (physiotherapists who specialise in acute orthopaedic rehabilitation and chronic pain management) developed a standard data extraction form based on the study aims, their clinical expertise, and discussion with other healthcare professionals within their clinical services. Data were collected on:

**1) Patient characteristics, medical history and presenting symptoms:**

a) age
b) gender
c) ethnicity
d) history of presenting condition
e) past medical history
f) social history

2) **Surgical and rehabilitation interventions and post-op FND symptoms:**
   a) type of surgery
   b) length of stay; actual and predicted (based on rehabilitation guidelines as referenced in table 1)
   c) FND related symptoms
   d) post-operative complications
3) **Discharge Information:**
   a) mobility on discharge
   b) destination upon discharge
   c) medical, physiotherapy/occupational therapy and psychological follow up

Between June 2022 and June 2023, the authors maintained a database of all patients in the adult orthopaedic service who had exhibited post-operative FND symptoms. These clinical records were then retrospectively reviewed (including imaging systems and hospital referral databases) to extract all relevant data. In order to obtain information regarding onwards referrals, some information was collected from external sources, including outpatient neurology clinics and GP practices.

**Results**

During the one-year period between June 2022 and June 2023, five patients met the study eligibility criteria and were included within this case series. This included two patients who had obtained a formal diagnosis during admission, two who were referred for neurology reviews in the community to establish an FND diagnosis and one who had FND symptoms, but did not receive neurological follow up

*Patient characteristics, medical and social history*

As demonstrated in Table 1, four patients were female and ages ranged from 41 to 57 years. Three patients were of Asian ethnicity and two were White English. All five patients had significant past medical histories and multiple co-morbidities such as spinal pathology (kyphosis, disc herniation, cervical spine degeneration), irritable bowel syndrome, migraine, obesity and blindness. All five patients had a pre-operative history of chronic pain and had experienced a gradual deterioration in mobility prior to admission; defined as increased reliance on mobility aids, reduced activity participation or increased care needs.

**Table 1: Patient Demographics, Type of surgery and Length of admission**

| Patient ID | Age & gender | Ethnicity | Type of surgery | Length of Admission (days) | Predicted Length of Admission (days) |
|---|---|---|---|---|---|
| **PT1** | 51 year old female | White, British | Removal of lumbar spine dynesis | 171 | 4 |
| **PT2** | 50 year old male | Asian | Three stage spinal deformity correction | 169 | 24 |
| **PT3** | 41 year old female | White, British | Periacetabular osteotomy and subsequent lateral cutaneous nerve lysis | 58 | 5 |
| **PT4** | 44 year old female | White, British | Bilateral L4/5 facet injections plus caudal epidural | 15 | Day Surgery (0) |
| **PT5** | 57 year old female | Asian | Anterior Cervical Decompression & Fixation | 14 | 3 |

Only one patient had been able to participate in sport and recreation pre-operatively. Three patients had a previously diagnosed mental health disorder and two patients were previously carers.

As demonstrated in Table 1, four patients had surgery involving the spine, while one patient had hip and pelvis surgery (periacetabular osteotomy and subsequent lateral cutaneous nerve lysis). The length of hospital admission was longer than predicted for all five patients (Table 1); predicted length of admission ranged from 0-24 days whereas actual length of admission ranged from 14 to 171 days.

Four patients developed FND symptoms on the day of, or day after their surgery, while one patient developed their symptoms on day 8 after surgery, following an inpatient fall (Figure 1). Four patients exhibited post-operative motor weakness or dysfunction that was inconsistent in nature; i.e. changed within function or with distraction. For example, inability to flex the elbow against gravity in formal testing but ability to lift the hand to the face in a grooming task. Two patients had dissociative seizures, with one case reporting seizures that lasted hours at a time; this long duration is typical within functional seizures (1) (see Table 2). After presenting with these symptoms, patients underwent subsequent imaging of the spine or brain (Table 2), which ruled out structural neurological pathology. All five patients experienced a change in mobility status post-operatively (for example pre-operatively independently mobile and post-operatively requiring use of a wheeled zimmer frame and close supervision) and therefore all required input from the inpatient therapy team. Three patients experienced an inpatient fall.

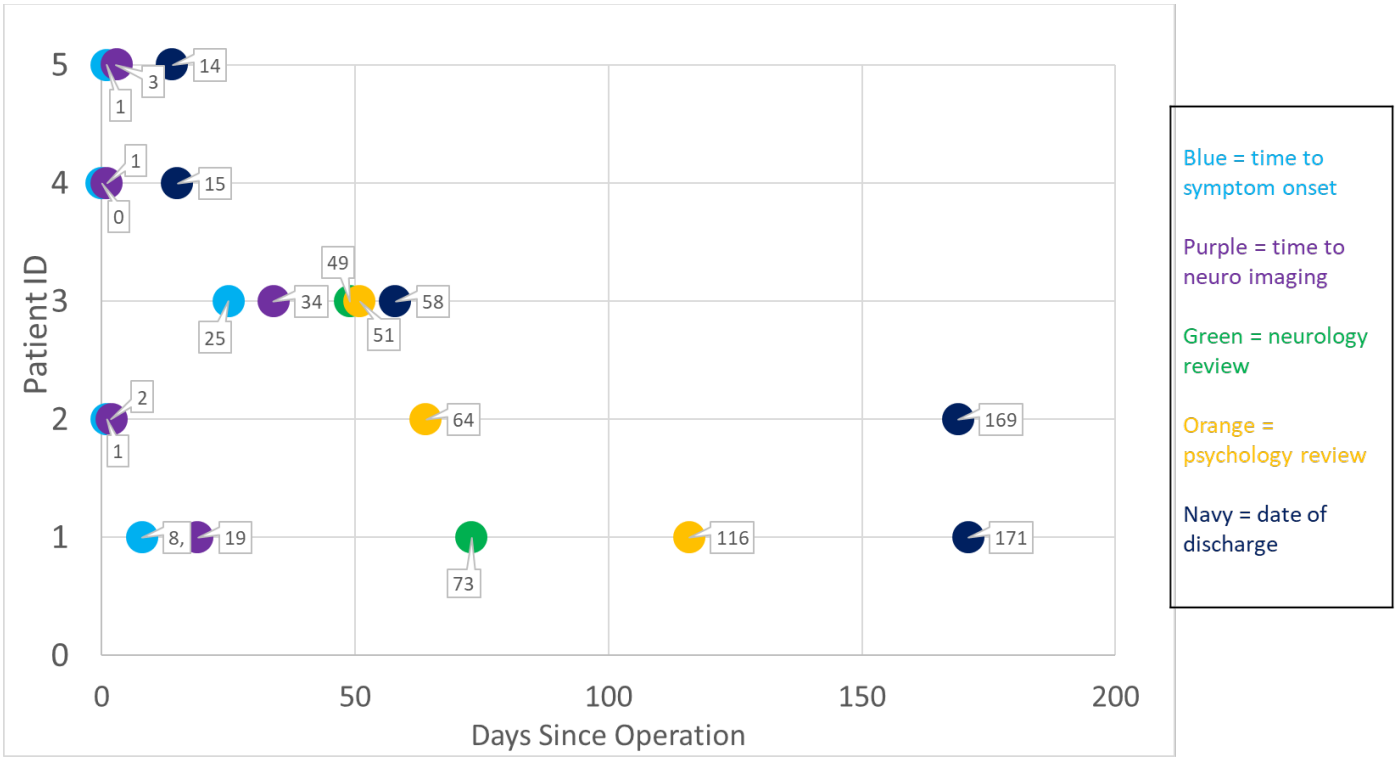


**Figure 1: Timeline of events from surgery to FND symptoms onset, imaging, neurology review, psychology review and date of discharge**

*Diagnostic status, discharge planning and follow-up*

Two patients were formally diagnosed with FND during their admission, and two patients were referred to outpatient neurology clinics or FND specialist clinics following discharge due to suspected diagnosis. Of the two patients who were diagnosed during their hospital admission, follow-up assessment for both patients was arranged at a specialist FND centre, either directly by the hospital, or via the GP. Only one patient did not have any follow-up arranged after discharge, since their FND symptoms were not documented in their discharge summary.

In terms of physiotherapy and occupational therapy input upon discharge, only one patient could not be discharged home as the level of support they required could not be met by a care package. They required referral to an interim placement to progress mobility goals. As demonstrated in table 3, all five patients were referred to community physiotherapy, as no local therapy services specific to FND were available. For one patient, the local neuro-physiotherapy team declined their referral because they had a diagnosis of FND.

With regards to psychology input upon discharge, one patient remained under the care of the psychology team within the specialist orthopaedic hospital, two patients received external outpatient psychology input, one patient was signposted to support groups and one patient did not receive any psychology input on discharge.

As illustrated in figure 1, the time from symptom onset to receiving relevant imaging varied between 0-12 days. Table 2 details the type of imaging or investigation that was carried out for each patient. Only two patients received a neurology review as an inpatient; these were the patients who also received an FND diagnosis. Of the three patients who received a psychology review as an inpatient, the average time to referral was 77 days.

**Table 2 – Post-operative symptoms, investigations and FND diagnosis status**

| Patient ID | FND Symptoms | Formal FND Diagnosis? | Other Post-Op Symptoms | Investigations |
|---|---|---|---|---|
| **PT 1** | Bilateral lower limb paraesthesia and motor loss<br>Difficulty swallowing & voice hoarseness<br>Twitching/Jerks<br>Bilateral upper limb paraesthesia | Yes | Pain<br>Blood spotting in urine<br>Urinary incontinence<br>Desaturation<br>Disorientation<br>Decreased balance<br>Drowsiness<br>Nausea & headaches | Psychology assessment<br>Tissue viability assessment<br>Lumbar spine X-ray<br>Pelvic x-ray<br>Knee x-ray |
| **PT2** | Bilateral dysfunctional lower limb movement<br>Ataxia<br>Twitching/jerks | No | Severe uncontrolled pain<br>Fatigue | Spine X-ray<br>CT spine lumbar<br>MRI whole spine<br>CT guided biopsy<br>MRI lumbar spine<br>MRI cervical spine<br>X-ray chest<br>Cone beam CT spine, |
| **PT 3** | Dissociative Seizures (non-epileptic seizures)<br>Twitching/jerks | Yes | Uncontrolled pain | X-ray pelvis<br>Cardiology referral<br>X-ray hips<br>CT pelvis<br>US hip<br>X-ray abdomen<br>MRI spine |
| **PT 4** | Unilateral motor and sensory loss<br>Dysfunctional movement | No | None | MRI lumbar spine |
| **PT5** | Vacant episodes<br>Left sided motor and sensory loss<br>Dysfunctional movement<br>Voice Hoarseness | No | Episodes of unresponsiveness<br>Uncontrolled pain | X-ray chest<br>X-ray Cervical spine<br>MRI head<br>MRI cervical spine |

**Abbreviations**: **ADL:** Activities of Daily Living, **OPA**: Out-patient Appointment, **FND**: Functional Neurological Disorder, **GP**: General practitioner, **WZF**: Wheeled Zimmer Frame, **PNI**: Peripheral Nerve Injury, **OT**: Occupational Therapy

## Discussion

This case series aimed to describe the characteristics of patients who developed symptoms of FND following orthopaedic surgery and report the impact on clinical services. The patients included in this case series remained undiagnosed for long periods of time, which was attributed to ongoing medical investigation, delays in obtaining neurology reviews or time spent waiting for appropriate services in the community. These delays meant that patients waited longer for referral to FND or neurological rehabilitation services and as such, waited longer for appropriate treatment of their symptoms. All patients included in this study had significantly longer admissions than predicted, suggesting a need for the generation and implementation of optimised screening and management pathways, to facilitate quicker diagnosis.

### *Characteristics of patients developing FND symptoms following orthopaedic surgery*

The patient characteristics in this case series are consistent with the literature, which indicates that

more females present with FND compared to males (20) and that peak incidence occurs between the ages of 35 and 50 (3). The majority of patients who developed signs and symptoms of FND had undergone spinal surgery. Development of FND following spinal surgery has been documented previously in the literature, albeit only in isolated case reports (16)(17)(15). All five patients in this case series had a history of chronic pain, while three had a history of mental health disorders. Studies have reported that there is a high incidence of FND within chronic pain populations (13) and it is known that patients with mental health disorders are at a higher risk of developing FND (21).

### *Signs and symptoms of FND and personal impact*

All patients included in this review exhibited neurological symptoms that were inconsistent or changeable in nature and could not be attributed to underlying structural pathology. Most commonly documented symptoms in this cohort of cases included weakness, sensory loss, dystonia, non-epileptic seizures and voice hoarseness, all of which are symptoms associated with FND (6).

The wide range of symptoms added complexity to assessment and management of these patients, who often required numerous diagnostic investigations and referral to multiple different teams, some of which were external to the hospital. These observations further highlight the absence of an established clinical pathway for patients who present with new FND symptoms within the acute orthopaedic environment. In the current case series, three patients with suspected signs and symptoms of FND were discharged without a formal diagnosis, resulting in implications for both the patients and clinical services. Firstly, since specialist FND services are limited in the UK, patients are commonly referred to community teams who may not have sufficient specialist knowledge, expertise and resources, such as time and sufficient staffing to adequately manage these patients (22). Secondly, current waiting times for community review can be up to 20 weeks (23), causing patients to remain unsupported and at further risk of deterioration following discharge from the hospital setting (24).

### *Impact on Clinical Services*

The average predicted length of admission for patients included in this case series was 7.2 days. The actual average length of admission was 85.4 days. This substantial increase in length of admission inevitably resulted in a considerable financial cost to the health service. While it was not possible to estimate the additional cost from the current case series, a recent prospective observational study found that the total hospital utilisation cost for 113 patients in Australia presenting with FND was AUD$3.5million over a 4-month period. The authors attributed the increased length of admission and subsequent cost predominantly to delays in diagnosis (5). Delays to obtaining diagnosis was also observed in the current case series, as only two patients obtained a formal diagnosis of FND during their admission. Of these patients, the time to diagnosis was 49 and 73 days.

### *Potential Barriers to Diagnosis*

Explicit and excessive focus by individuals on physiological states has been identified as a driving mechanism for FND (11). Early diagnosis is therefore thought to be beneficial to reduce focus and subsequent anxiety around symptoms (24). The DSM-5 recommends that a diagnosis of FND should be made by a neurologist or neuropsychiatrist, and delivering the diagnosis requires skill, with many reported pitfalls arising for those with less experience of the condition (25).

There was considerable variability in the trajectory to diagnosis for patients included in this study. This may be attributed to a number of causes. Firstly, obtaining a specialist neurology review in a specialist orthopaedic hospital that does not have access to an on-site neurology team was challenging. Consequently, neurology reviews were sourced externally, leading to further diagnostic delays. Secondly, the clinical presentations of FND can often be complex and variable, with FND symptoms presenting alongside structural neurological pathology; this possibility of dual diagnosis may make identification of functional symptoms challenging, as it is difficult to determine where structural pathology ends and functional pathology begins (26). Additionally, lack of awareness of FND within the existing orthopaedic multidisciplinary team may have contributed to symptoms being missed, and therefore, timely referral to a neurologist may have been delayed (27).

Variability in diagnostic practice highlights the need for a standardised pathway for this patient cohort to improve outcomes, such as the pathway described by the national neurosciences advisory group (27).

*Limitations*

The findings of case series provide valuable insights, particularly in the case of rare diseases or atypical settings, where there is a limited existing evidence base (28). They can be particularly useful for informing the design of future, more rigorous research involving the collection/analysis of prospective data, such as factors associated with development of FND following orthopaedic surgery. However, this study has several limitations associated with the use of a retrospective case series design (30).

It is not possible to generalise the findings or establish causal relationships in the absence of a control group and small sample size (28). All observations documented in this case series should be interpreted with caution and larger cohort studies are needed in the future to further investigate these preliminary observations. Secondly, this case series was conducted using data which were collected retrospectively from hospital clinical notes systems. While the analysis of retrospective data plays an important role in service reviews (29), the use of retrospective data imposes inherent limitations, including lack of known accuracy of data. Thirdly, it was not possible to follow patient journeys beyond discharge within the boundaries of a service evaluation, as relevant research governance approvals were not in place. As such, a definitive diagnosis of FND was not obtained for three of the patients irrespective of their symptoms. It is therefore possible that the symptoms of these three patients may have been mis-attributed to FND.

*Future Research*

This case series has documented the signs and symptoms of five patients that developed FND symptoms following orthopaedic surgeries within a specialist orthopaedic centre. Future research involving larger cohorts is needed to explore these novel observations to improve the understanding of patients who develop suspected FND symptoms following orthopaedic surgeries. Enhancing knowledge surrounding this patient cohort would ultimately raise awareness amongst clinicians to facilitate earlier diagnosis and standardised management pathways within the orthopaedic setting. To support this longer-term aim, there is a need for qualitative research to explore the experiences and perspectives of these patients towards their diagnosis and management. There is also a need to establish current practice for identifying and managing these patients amongst orthopaedic centres e.g. through surveys to inform the development of effective clinical pathways.

*Conclusions*

All five patients who developed FND or had suspected FND following orthopaedic surgeries had extended length of admissions, which may have arisen from the absence of established management pathways. Barriers to diagnosis may have included lack of an established link to a neurologist and complex clinical presentations. Future research involving larger cohorts across multiple sites is needed to enhance understanding around this patient cohort and to explore the role of management pathways, which are tailored to the needs of the acute orthopaedic setting.

**Acknowledgements**

The authors thank the adult orthopaedic therapy team for granting clinical time to complete the project, and to the hospital library services for their input to facilitate literature searches and referencing.

**Declaration of interest statement:**

The authors report there are no competing interests to declare.

**Funding Statement:**

This study was unfunded and the authors did not receive any sources of financial funding to support the study.

**Data availability statement:**

Anonymised data can be obtained from the authors on reasonable request.

**References**

1. Stone J, Burton C, Carson A. Recognising and explaining functional neurological disorder. BMJ [Internet]. 2020 Oct 21 [cited 2024 Mar 21];371. Available from: https://www.bmj.com/content/371/bmj.m3745 DOI: 10.1136/bmj.m3745
2. Stefánsson JG, Messina JA, Meyerowitz S. Hysterical Neurosis, Conversion Type: Clinical and Epidemiological Considerations. Acta Psychiatr Scand. 1976;53(2). DOI: 10.1111/j.1600-0447.1976.tb00066.x
3. Carson A, Lehn A. Chapter 5 – Epidemiology. Handb Clin Neurol. 2016;139. DOI: 10.1016/B978-0-12-801772-2.00005-9
4. Stone J, Sharpe M, Rothwell PM, Warlow CP. The 12 year prognosis of unilateral functional weakness and sensory disturbance. J Neurol Neurosurg

Psychiatry. 2003;74(5). DOI: 10.1136/jnnp.74.5.591
5. Petrie D, Lehn A, Barratt J, Hughes A, Roberts K, Fitzhenry S, et al. How Is Functional Neurological Disorder Managed in Australian Hospitals? A Multi-Site Study Conducted on Acute Inpatient and Inpatient Rehabilitation Wards. Mov Disord Clin Pract. 2023;10(5). DOI: 10.1002/mdc3.13718
6. Bennett K, Diamond C, Hoeritzauer I, Gardiner P, McWhirter L, Carson A, et al. A practical review of functional neurological disorder (FND) for the general physician. Vol. 21, Clinical Medicine, Journal of the Royal College of Physicians of London. 2021. DOI: 10.7861/CLINMED.2020-0987
7. Mishra A, Pandey S. Functional Neurological Disorders: Clinical Spectrum, Diagnosis, and Treatment. Neurologist [Internet]. 2022 Sep 18 [cited 2024 Mar 21];27(5):276–89. Available from: https://journals.lww.com/theneurologist/fulltext/2022/09000/functional_neurological_disorders__clinical.11.aspx DOI: 10.1097/NRL.0000000000000453
8. Lidstone SC, Nassif W, Juncos J, Factor SA, Lang AE. Diagnosing functional neurological disorder: Seeing the whole picture. Vol. 26, CNS Spectrums. 2021. DOI: 10.1017/S1092852920001996
9. Tinazzi M, Gandolfi M, Landi S, Leardini C. Economic Costs of Delayed Diagnosis of Functional Motor Disorders: Preliminary Results From a Cohort of Patients of a Specialized Clinic. Front Neurol. 2021;12. DOI: 10.3389/fneur.2021.786126
10. O'Keeffe S, Chowdhury I, Sinanaj A, Ewang I, Blain C, Teodoro T, et al. A Service Evaluation of the Experiences of Patients With Functional Neurological Disorders Within the NHS. Front Neurol [Internet]. 2021 May 31 [cited 2024 Mar 21];12:656466. Available from: www.frontiersin.org DOI: 10.3389/FNEUR.2021.656466/BIBTEX
11. Drane DL, Fani N, Hallett M, Khalsa SS, Perez DL, Roberts NA. A framework for understanding the pathophysiology of functional neurological disorder. CNS Spectr. 2021;26(6). DOI: 10.1017/S1092852920001789
12. Paredes-Echeverri S, Guthrie AJ, Perez DL. Toward a possible trauma subtype of functional neurological disorder: Impact on symptom severity and physical health. Front Psychiatry. 2022;13. DOI: 10.3389/fpsyt.2022.1040911
13. Mason I, Renée J, Marples I, McWhirter L, Carson A, Stone J, et al. Functional neurological disorder is common in patients attending chronic pain clinics. Eur J Neurol. 2023;30(9). DOI: 10.1111/ENE.15892
14. Huepe-Artigas D, Singh P, Weinberg L, Kanaan RAA. Anaesthesia and the development of functional neurological disorder: A systematic review and case series. Gen Hosp Psychiatry [Internet]. 2022 [cited 2024 Mar 21];78:72–9. Available from: https://doi.org/10.1016/j.genhosppsych.2022.07.011 DOI: 10.1016/j.genhosppsych.2022.07.011
15. Bezerra DM, Bezerra EM, Silva Junior AJ, Amorim MAS, Miranda DB de. [Postoperative visual loss due to conversion disorder after spine surgery: a case report]. Braz J Anesthesiol [Internet]. 2018 Jan 1 [cited 2024 Mar 21];68(1):91–5. Available from: https://pubmed.ncbi.nlm.nih.gov/26804714/ DOI: 10.1016/J.BJAN.2015.03.004
16. Mitchell BP, Bianco JM, Kim FMG, Whitaker MC. New diagnosis of conversion disorder following anterior lumbar interbody fusion: a case report. J Surg Case Rep [Internet]. 2023 Jun 1 [cited 2024 Mar 21];2023(6):1–3. Available from: /pmc/articles/PMC10276951/ DOI: 10.1093/JSCR/RJAD341
17. Yerneni K, Wadhwa H, Fatemi P, Zygourakis CC. Functional neurological disorders in patients undergoing spinal surgery: illustrative case. Journal of Neurosurgery: Case Lessons [Internet]. 2021 Jan 1 [cited 2024 Mar 21];1(2):2021. Available from: /pmc/articles/PMC9241316/ DOI: 10.3171/CASE2068
18. Kawaji Q, Blitzer D, Kool S, Crowner J. Case series. In: Handbook for Designing and Conducting Clinical and Translational Surgery. 2023. DOI: 10.1016/B978-0-323-90300-4.00023-9
19. CARE Case Report Guidelines [Internet]. [cited 2024 Mar 21]. Available from: https://www.care-statement.org/
20. Baizabal-Carvallo JF, Jankovic J. Gender Differences in Functional Movement Disorders. Mov Disord Clin Pract [Internet]. 2019 Feb 1 [cited 2024 Mar 21];7(2):182–7. Available from: https://pubmed.ncbi.nlm.nih.gov/32071937/ DOI: 10.1002/MDC3.12864
21. Butler M, Shipston-Sharman O, Seynaeve M, Bao J, Pick S, Bradley-Westguard A, et al. International online survey of 1048 individuals with functional neurological disorder. Eur J Neurol [Internet]. 2021 Nov 1 [cited 2024 Mar 21];28(11):3591–602. Available from: https://onlinelibrary.wiley.com/doi/full/10.1111/ene.15018 DOI: 10.1111/ENE.15018
22. Nicholson C, Francis J, Nielsen G, Lorencatto F. Barriers and enablers to providing community-based occupational therapy to people with functional neurological disorder: An interview study with occupational therapists in the United Kingdom. https://doi.org/101177/03080226211020658 [Internet]. 2021 May 27 [cited 2024 Mar 21];85(4):262–73. Available from:

https://journals.sagepub.com/ DOI: 10.1177/03080226211020658
23. Passaient LA, Landry MD, Cott CA. Wait times for publicly funded outpatient and community physiotherapy and occupational therapy services: Implications for the increasing number of persons with chronic conditions in Ontario, Canada. Physiotherapy Canada. 2009;61(1). DOI: 10.3138/physio.61.1.5
24. Aybek S, Perez DL. Diagnosis and management of functional neurological disorder. Vol. 376, The BMJ. 2022. DOI: 10.1136/bmj.o64
25. Pimentel Filho LH, Mutarelli EG. Diagnostic pitfalls in functional neurological disorders. Arq Neuropsiquiatr. 2022;80. DOI: 10.1590/0004-282X-ANP-2022-S120
26. Walzl D, Solomon AJ, Stone J. Functional neurological disorder and multiple sclerosis: a systematic review of misdiagnosis and clinical overlap. J Neurol [Internet]. 2022 Feb 1 [cited 2024 Mar 21];269(2):654–63. Available from: https://link.springer.com/article/10.1007/s00415-021-10436-6 DOI: 10.1007/S00415-021-10436-6/TABLES/3
27. Optimal clinical pathway for adults with Functional Neurological Disorder FND — National Neurosciences Advisory Group [Internet]. [cited 2024 Mar 21]. Available from: https://nnag.squarespace.com/optimal-clinical-pathway-adults-fnd-functional-neurological-disorder
28. Nissen T, Wynn R. The clinical case report: A review of its merits and limitations. BMC Res Notes [Internet]. 2014 Apr 23 [cited 2024 Mar 21];7(1):1–7. Available from: https://bmcresnotes.biomedcentral.com/articles/10.1186/1756-0500-7-264 DOI: 10.1186/1756-0500-7-264/METRICS
29. Talari K, Goyal M. Retrospective Studies – Utility and Caveats. https://doi.org/104997/jrcpe2020409 [Internet]. 2020 Dec 1 [cited 2024 Mar 21];50(4):398–402. Available from: https://journals.sagepub.com/doi/abs/10.4997/jrcpe.2020.409 DOI: 10.4997/JRCPE.2020.409