Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

# Functional Neurological Disorder Presenting as Acute Hemiparesis with Normal Neuroimaging: A Stroke Mimic Case Report

**Anjana. K. P**
KMCT College of Allied Health Sciences, Kozhikode, India https://orcid.org/0009-0003-8721-3681
**Avinash Krishnan**
Composite Regional Centre for Skill Development Rehabilitation and Empowerment of Persons with Disabilities, Kozhikode, India https://orcid.org/0009-0008-1371-034X
**Binoy Mathew K V**
binoy9797@gmail.com
Composite Regional Centre for Skill Development Rehabilitation and Empowerment of Persons with Disabilities, Kozhikode, India https://orcid.org/0000-0002-9637-1214
**Gladies Kamalam S**
KMCT College of Allied Health Sciences, Kozhikode, India https://orcid.org/0000-0001-9384-0380
**Santheep S**
KMCT College of Allied Health Sciences, Kozhikode, India https://orcid.org/0009-0005-8715-6554

**Case Report**

**Keywords:** Stroke Mimic, Functional Neurological Disorder, Case Report, Hemiparesis, Misdiagnosis

**Posted Date:** March 8th, 2026

**DOI:** https://doi.org/10.21203/rs.3.rs-9016868/v1

**License:** This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

**Additional Declarations:** The authors declare no competing interests.

## Abstract

# Background

Functional Neurological Disorder (FND) is a disabling condition characterized by neurological symptoms that are not explained by structural pathology but by abnormal nervous system functioning. It commonly presents with motor and sensory deficits and may mimic acute neurological conditions such as stroke. This overlap often leads to diagnostic uncertainty, unnecessary investigations, and delayed appropriate rehabilitation. Early recognition and multidisciplinary management are essential for optimal recovery.

# Presentation

A 30-year-old female with no known vascular risk factors presented with sudden onset numbness over the right angle of the mouth, deviation of the mouth to the opposite side, and slurred speech, followed by weakness and sensory disturbances in the right upper and lower limbs. As the symptoms progressed rapidly, she was evaluated under acute stroke protocol. Initial CT imaging suggested a possible ischemic lesion in the left sublentiform region. However, subsequent MRI brain and MR angiography did not reveal any infarction or vascular abnormality. Neurological examination showed mild weakness (MRC grade 4/5), reduced grip strength, painful restriction of proximal joint movements, gait disturbance, and inconsistent sensory findings. The patient also had significant psychosocial stress and was on treatment for anxiety and depression. Based on the absence of structural pathology and clinicoradiological dissociation, a diagnosis of Functional Neurological Disorder presenting as a stroke mimic was made. She underwent a structured physiotherapy program focusing on motor retraining, strengthening, balance training, and functional mobility, which resulted in gradual improvement in functional abilities.

# Conclusions

Functional Neurological Disorder should be considered an important differential diagnosis in patients presenting with acute stroke-like symptoms, especially in young individuals with normal neuroimaging. Clinicoradiological dissociation, inconsistent neurological findings, and psychosocial factors are key diagnostic indicators. Early diagnosis and multidisciplinary rehabilitation, including physiotherapy and psychological support are crucial for promoting recovery, restoring functional independence, and improving overall quality of life.

## INTRODUCTION

Functional Neurological Disorder (FND) is a common condition that can lead to long-lasting and disabling neurological symptoms.[1]The term functional neurological disorder (FND) refers to a condition in which the brain’s structure is usually normal, but the way it functions is disrupted.[2]People with FND

may experience a wide range of difficulties. Some may have problems with movement, such as weakness, tremors, or unusual postures. Others may have episodes that look similar to epileptic seizures, often called functional or dissociative seizures. Some individuals also report changes in sensation, like numbness or altered feelings in different parts of the body.[3]Healthcare professionals in medicine, neurology, and rehabilitation commonly come across patients with Functional Neurological Disorder (FND). It is a fairly common condition that can deeply impact a person's ability to function in everyday life. Many individuals with FND struggle with symptoms that interfere with work, mobility, and independence, making it both physically and emotionally challenging.[4]

Functional Neurological Disorder (FND) can occur at almost any age. It has been reported in children as young as 4 years and in adults up to 94 years old.[5] Each year, about 4–12 per 100,000 people develop Functional Neurological Disorder (FND). Seizure-type FND occurs in roughly 1.5–5 per 100,000 people annually. Overall, around 50 per 100,000 people are estimated to be living with FND, with seizure-type FND affecting about 2–33 per 100,000 people.[6] FND is a complex condition influenced by many factors. Recent psychological stress and childhood adversity, especially neglect, increase the risk of developing FND. It is more commonly seen in women, possibly due to higher rates of early life adversity.[7] FND often coexists with anxiety, depression, and traumatic stress disorders. It is also associated with other functional conditions like irritable bowel syndrome and chronic pain, suggesting shared underlying mechanisms.[8]

Functional Movement Disorder (FMD) often begins suddenly and can cause weakness or paralysis, which makes it look very similar to a stroke, migraine, or seizure. Because of this sudden presentation, some patients are even treated as stroke cases and may receive thrombolysis or be admitted to the hospital. In one study of 1,165 patients who came with stroke-like symptoms, 78% were diagnosed with actual stroke, 14% had other medical conditions, and about 8.4% were found to have FMD.[9] In this report, we describe a young female who presented with acute hemiparesis initially suspected as ischemic stroke and was subsequently diagnosed with Functional Neurological Disorder.

# CASE DESCRIPTION

A 30-year-old female with no known comorbidities presented with sudden onset numbness over the right angle of the mouth at approximately 2:30 PM on 28 January 2026, followed by deviation of the mouth to the left side and slurring of speech. She subsequently developed weakness and sensory disturbances involving the right upper and lower limbs. The symptoms progressively worsened over the next two hours, reaching peak severity by around 4:30 PM on the same day. There was no history of loss of consciousness, seizures, visual disturbances, or dysphagia. In view of the acute onset focal neurological deficits, she was immediately taken to a tertiary care hospital, where she was evaluated under acute stroke protocol and received emergency medical management. However, she continued to experience right-sided limb weakness, sensory disturbances, and functional limitations, and was admitted for further neurological evaluation and monitoring. Initial neuroimaging with non-contrast computed

tomography (CT) of the brain demonstrated a subtle hypodense area involving the left sublentiform region, raising suspicion of an early ischemic lesion. Given the clinical presentation and radiological concern, further evaluation with magnetic resonance imaging (MRI) of the brain and MR angiography was performed. However, subsequent MRI did not reveal diffusion restriction, acute infarction, or focal structural lesion corresponding to the clinical deficits. MR angiography of the intracranial and extracranial vessels showed no evidence of large vessel occlusion, arterial stenosis, or vascular abnormality. Whole spine MRI revealed decreased cervical lordosis with mild multilevel disc bulges from C4 to C7 without cord compression or canal stenosis. Despite the initial radiological suspicion of a left sublentiform infarct, the absence of confirmatory findings on MRI brain and MR angiography, along with fluctuating symptomatology and non-anatomical distribution of deficits, led to a clinicoradiological dissociation. After multidisciplinary case discussion, a final diagnosis of Functional Neurological Disorder presenting as acute stroke mimic was established on 12 February 2026.

The patient was also noted to be on antidepressant and anxiolytic medications and had a history of iron deficiency. There was no significant past medical history of hypertension, diabetes mellitus, cardiac disease, or prior documented cerebrovascular accident. She had recently undergone dental extraction on the right side. On general examination, she was moderately built and hemodynamically stable. Mild puffiness over the right side of the face was observed. Neurological examination revealed right-sided motor weakness with muscle strength graded as 4/5 in the major muscle groups of both the upper and lower limbs (Medical Research Council scale). Grip strength of the right hand was reduced. Painful restriction was observed at the end range of motion of major proximal joints such as shoulder and hipon the affected side. Mild hypertonicity was noted on the affected side. Gait assessment revealed a mild limping pattern with reduced heel strike on the right side. Balance evaluation demonstrated mildly impaired right-sided weight bearing and reduced single-leg stance stability, partly limited by pain. Sensory findings were inconsistent and did not conform to a clear dermatomal or cortical pattern.

The patient was referred for physiotherapy rehabilitation to address persistent motor weakness, impaired balance, and functional mobility limitations. A structured, graded rehabilitation program was initiated focusing on motor retraining, strength restoration, and functional independence. Range of motion exercises were performed for both upper and lower limbs to maintain joint mobility and prevent stiffness. Strengthening exercises for both upper and lower limbs were performed using graded manual resistance and progressive resistance training with therabands, tailored to the patient's tolerance and performance. Task-specific functional training included sit-to-stand practice, squatting, stair climbing, and gait training with progression to sideways walking, backward walking, and obstacle negotiation such as hurdle crossing to improve coordination and confidence during ambulation. Balance and postural control training were emphasized through exercises including heel raises, toe raises, single-leg stance, and standing with narrow and wide base of support under eyes-open and eyes-closed conditions to enhance proprioceptive control. In addition, whole-body vibration therapy using a proprioceptive training device was incorporated to facilitate neuromuscular activation and improve postural stability. The rehabilitation program was delivered in a graded and supportive manner, with continuous encouragement and feedback to promote normal movement patterns and functional recovery.

# DISCUSSION

Functional Neurological Disorder (FND) is a common yet frequently misunderstood neurological condition characterized by the presence of neurological symptoms that are not explained by structural neurological pathology but rather by abnormal nervous system functioning.[2] It represents a disorder of brain network functioning rather than brain damage, and symptoms are genuine and involuntary. One of the most important clinical challenges associated with FND is its frequent presentation as a stroke mimic, particularly when patients present with sudden onset hemiparesis, sensory disturbances, or facial symptoms, as observed in the present case.[9]

In this case, the patient presented with acute onset right-sided hemiparesis and facial numbness, which are classical warning signs of acute ischemic stroke. Initial CT imaging showed a subtle hypodense area in the left sublentiform region, further raising suspicion of ischemic infarction. However, subsequent MRI brain and MR angiography failed to demonstrate diffusion restriction, vascular occlusion, or structural abnormalities corresponding to the neurological deficits. This clinicoradiological dissociation, where clinical symptoms are not supported by objective neuroimaging findings, represents a key diagnostic feature of Functional Neurological Disorder. Such dissociation is considered an important indicator prompting reconsideration of alternative diagnoses, including FND, especially when symptoms do not conform to known neuroanatomical patterns.

Several clinical features observed in this patient are consistent with the typical profile of Functional Neurological Disorder. FND is more commonly seen in young adults, particularly females, and is often associated with psychological stressors, anxiety, and depression.[5, 7]The present patient was a young female and had a documented history of psychosocial stress related to family responsibilities, including caregiving stress as a mother of three children and ongoing family conflicts in a joint family setting. These psychosocial stressors are well recognized precipitating and perpetuating factors in the development of FND, supporting the biopsychosocial model of this disorder. Functional Neurological Disorder may present with a wide spectrum of symptoms, including functional limb weakness, sensory disturbances, abnormal movements, gait abnormalities, and functional seizures.[3] Although functional seizures are commonly reported, they are not present in all patients with FND. In the present case, the patient did not report seizure activity, loss of consciousness, or epileptic features, which is consistent with the subtype of Functional Neurological Disorder presenting predominantly with motor and sensory deficits, often referred to as Functional Movement Disorder or functional limb weakness. The absence of seizures does not exclude FND, as motor weakness and sensory dysfunction are among the most common presenting features.

The present case highlights the diagnostic challenge posed by Functional Neurological Disorder in acute stroke settings. Stroke mimics account for a significant proportion of acute stroke presentations, and FND is one of the most common non-vascular causes. Misdiagnosis can lead to unnecessary investigations, inappropriate treatments, increased healthcare burden, and patient distress. Therefore,

FND should always be considered in the differential diagnosis of acute hemiparesis, especially when neuroimaging findings are normal or inconclusive, and when clinical features are inconsistent with known neuroanatomical patterns.

The pathophysiology of Functional Neurological Disorder is currently understood as involving abnormal functioning of brain networks responsible for voluntary movement, emotional regulation, attention, and motor control. Functional neuroimaging studies have demonstrated altered connectivity between limbic regions, supplementary motor areas, and prefrontal cortex, which may impair voluntary motor control and produce genuine neurological symptoms without structural damage. Psychological stress, emotional trauma, and maladaptive coping mechanisms may contribute to the development and maintenance of symptoms by influencing brain network functioning.[4]

Management of Functional Neurological Disorder involves a multidisciplinary approach including patient education, psychological support, physiotherapy, and medical management of associated conditions such as anxiety and depression. In the present case, the patient received antidepressant and anxiolytic medications to address psychological factors contributing to symptom development. Physiotherapy played a crucial role in functional recovery and included motor retraining, graded strengthening exercises, balance training, gait re-education, and functional mobility training. These interventions aim to restore normal movement patterns, improve motor control, enhance confidence, and reduce disability. Unlike structural neurological disorders, physiotherapy in FND focuses on retraining normal movement and reducing maladaptive movement patterns rather than compensating for permanent neurological damage.

This case emphasizes the importance of careful clinicoradiological correlation in patients presenting with acute stroke-like symptoms. The absence of structural abnormalities on MRI and angiography, presence of psychosocial stressors, inconsistent neurological findings, and a favourable response to rehabilitation strongly supported the diagnosis of Functional Neurological Disorder. Early recognition of FND is essential to avoid misdiagnosis, prevent unnecessary medical interventions, and initiate appropriate rehabilitation strategies. In conclusion, Functional Neurological Disorder should be considered an important differential diagnosis in patients presenting with acute hemiparesis and suspected stroke, particularly when neuroimaging findings are inconclusive or inconsistent with clinical presentation. Early diagnosis, multidisciplinary management, and physiotherapy-based rehabilitation are essential for optimal functional recovery and improved patient outcomes.

# CONCLUSION

Functional Neurological Disorder is an important differential diagnosis in patients presenting with acute stroke-like symptoms, particularly in young individuals without structural abnormalities on neuroimaging. The present case highlights the diagnostic challenge of FND, where sudden onset hemiparesis and facial symptoms initially suggested an ischemic stroke, but normal MRI and MR angiography findings demonstrated a clear clinicoradiological dissociation. The presence of psychosocial stressors,

associated anxiety requiring pharmacological management, and inconsistent neurological findings further supported the diagnosis of Functional Neurological Disorder.

This case emphasizes the importance of including FND in the differential diagnosis of acute focal neurological deficits, especially when neuroimaging findings are inconclusive. Early and accurate diagnosis helps prevent unnecessary interventions and reduces patient distress. Physiotherapy-based rehabilitation focusing on motor retraining, graded strengthening, balance training, and functional task-specific exercises played a key role in improving motor function and functional independence. Early multidisciplinary management, including medical, psychological, and physiotherapy interventions, is essential for optimal recovery and improved quality of life.

## Declarations

The participants provided written informed consent for participating in the study and publish the clinical findings.

## References


1. Gilmour GS, Nielsen G, Teodoro T, Yogarajah M, Coebergh JA, Dilley MD, Martino D, Edwards MJ. Management of functional neurological disorder. Journal of neurology. 2020 Jul;267(7):2164-72
2. Mark Hallett MD, Selma Aybek MD, Barbara AD, MD LM, MD JS. Functional Neurological Disorder: New Phenotypes, Common Mechanisms. Lancet Neurol. 2022 Jun;21(6):537-50.
3. Stone J. Functional neurological disorders: the neurological assessment as treatment. Practical Neurology. 2016 Feb 1;16(1):7-17.
4. Aybek S, Perez DL. Diagnosis and management of functional neurological disorder. bmj. 2022 Jan 24;376.
5. Chouksey A, Pandey S. Functional movement disorders in elderly. Tremor and Other Hyperkinetic Movements. 2019 Jul 30;9:10-7916.
6. Gelauff J, Stone J, Edwards M, Carson A. The prognosis of functional (psychogenic) motor symptoms: a systematic review. Journal of Neurology, Neurosurgery & Psychiatry. 2014 Feb 1;85(2):220-6.
7. Ludwig L, Pasman JA, Nicholson T, Aybek S, David AS, Tuck S, Kanaan RA, Roelofs K, Carson A, Stone J. Stressful life events and maltreatment in conversion (functional neurological) disorder: systematic review and meta-analysis of case-control studies. The Lancet Psychiatry. 2018 Apr 1;5(4):307-20
8. Tinazzi M, Morgante F, Marcuzzo E, Erro R, Barone P, Ceravolo R, Mazzucchi S, Pilotto A, Padovani A, Romito LM, Eleopra R. Clinical correlates of functional motor disorders: an Italian multicenter study. Movement Disorders Clinical Practice. 2020 Nov;7(8):920-9

9. Gargalas S, Weeks R, Khan-Bourne N, Shotbolt P, Simblett S, Ashraf L, Doyle C, Bancroft V, David AS. Incidence and outcome of functional stroke mimics admitted to a hyperacute stroke unit. Journal of Neurology, Neurosurgery & Psychiatry. 2017 Jan 1;88(1):2-6

# Figures

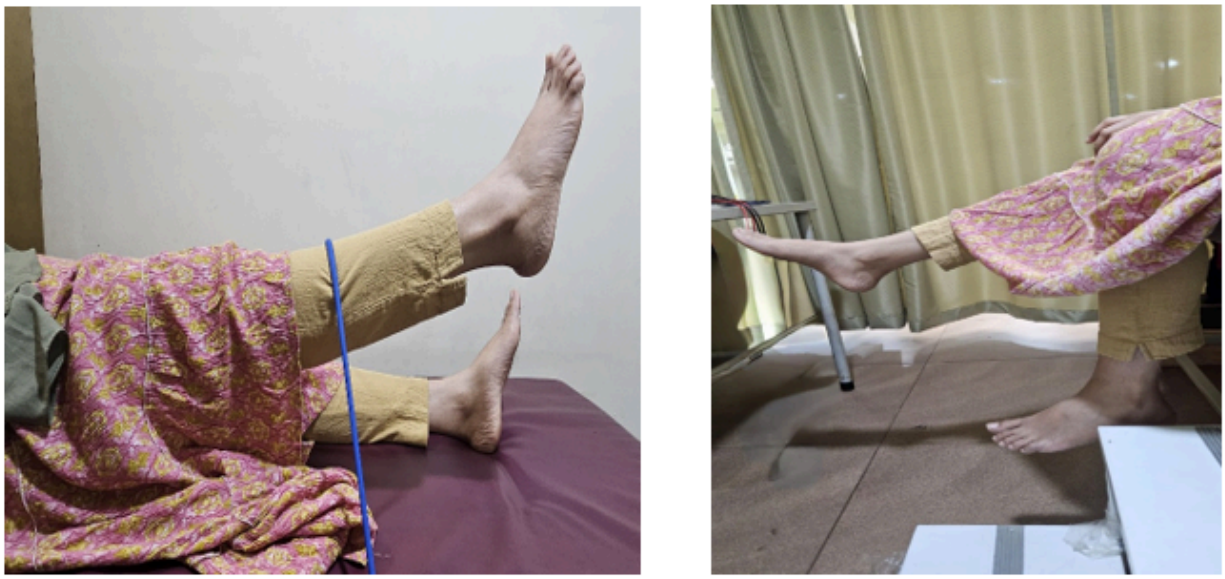


**Figure 1**

## Physiotherapy Interventions