



## Investigations into the Identification and Management of Functional Movement Impairments

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### Introduction

Functional movement disorders (FMD) refer to movement abnormalities that are altered by distraction or non-physiological manipulation and are clinically inconsistent with movement disorders associated with neurological diseases. This broader category encompasses the majority of cases of functional neuropathies. According to a study, functional neuropathy accounts for 15% of referrals to neurology clinics, second only to headache. These disorders are prevalent in neurological practice, yet prognosis is often poor, with a study showing that 39% of patients had similar or improved outcomes at long-term follow-up, despite experiencing high levels of physical disability and mental comorbidities. Historically, neurologists and psychiatrists have struggled to provide effective treatment options for FMD patients, leaving them in a therapeutic void [1].

Recent advancements in understanding FMD have led to changes in terminology and a better understanding of the disease's pathophysiology, as well as the development of effective treatment approaches. These developments offer hope in a field that has long been associated with patient and caregiver frustration. The term "psychogenic movement disorder" has been debated in the literature, with a broader term, "functional movement disorder," proposed instead. Diagnosis is based on positive symptoms and signs rather than the presence of psychopathology. It remains uncertain whether psychological triggers are absent or simply unrecognized in many patients, as psychological factors may not always be identifiable. The term "functional" is commonly used among peers in the field of movement disorders, acknowledging that the underlying cause of these symptoms may not be immediately apparent and is akin to terminology used in other medical specialties [2]. Notably, the DSM-5 includes a category for "functional neurological disorder," with criteria revised to emphasize the importance of a neurological examination and the potential absence of psychological factors associated with the disorder. Clinical findings must demonstrate that symptoms and perceived neurological conditions are incongruent [3].

Scientists continue to investigate the psychological foundations of Functional Movement Disorder (FMD), with recent studies aiming to validate Freudian theories of conversion and, conversely, to support the removal of criteria for psychological stressors from the DSM-5. A case-control study involving 51 individuals with FMD compared self-reported measures of depression, anxiety, dissociation, and behavioral symptoms to individuals with neurological movement disorders and healthy controls [4]. Results showed that patients with FMD scored similarly to those with neurological movement disorders on measures of depression, anxiety, and psychological dissociation, except for somatic dissociative symptoms. The study concluded that psychologically, individuals with FMD are not significantly different from those with neurological movement disorders, and many FMD patients do not exhibit psychopathology detectable on symptom screening tests.

Nicholson examined severe life events and escape events in the year preceding symptom onset in 43 patients with motor conversion disorder, 28 with depression, and 28 healthy controls using the Life

Events and Difficulties Schedule. It was found that 56% of conversion disorder patients experienced at least one major event in the month before symptom onset, compared to 21% of depressed patients and 18% of healthy controls. Additionally, 53% of conversion disorder patients experienced at least one high-escape event, compared to depressed patients and healthy controls [5]. The study suggests that routine assessment may miss many life events related to etiology, highlighting the need for thorough and specific questioning skills to identify these events. It remains unclear whether such events represent transient triggers or significant contributing factors to symptoms.

Overall, these findings indicate that individuals with FMD come from diverse psychological backgrounds, and a simplistic approach to diagnosis and treatment overlooks this complexity. A comprehensive examination of psychological factors contributing to vulnerability and symptom maintenance in FMD is valuable and should be part of an individualized approach to diagnosis and treatment. Diagnostic and treatment frameworks should be adaptable to accommodate these nuances if relevant factors are not identified or if factors that conferred susceptibility are currently inactive.

FMD exhibits characteristics related to movement, suggesting potential impairment in the mechanisms responsible for sensing agency in movement. In some cases in neurology and psychiatry, individuals may experience what appear to be spontaneous movements, such as alien limb phenomenon, apraxia, and psychotic control in schizophrenia. These phenomena are often attributed to disordered mechanisms of agency conveyance [6]. Sensory attenuation, the phenomenon of reduced sensation intensity caused by self-generated movement, is believed to be crucial in distinguishing self-produced movements and is associated with loss of motor control. Recent research using a force-matching paradigm investigated sensory hypo function in FMD patients.

Healthy participants typically generate more force than necessary during self-initiated movements compared to externally imposed conditions due to sensory attenuation. However, individuals with FMD displayed significantly more accuracy than healthy controls in self-initiated force assessments, with no difference in performance for externally imposed conditions. This difference in performance is attributed to the lack of sensory attenuation in FMD patients, suggesting a deficit in autogenous movement control. The findings

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**Received:** 30-Jan-2024, Manuscript No. cnoa-24-128213; **Editor assigned:** 02-Feb-2024, PreQC No. cnoa-24-128213(PQ); **Reviewed:** 16-Feb-2024, QC No. cnoa-24-128213; **Revised:** 23-Feb-2024, Manuscript No. cnoa-24-128213(R); **Published:** 29-Feb-2024, DOI: 10.4172/cnoa.1000224

**Citation:** Shrivastav A (2024) Investigations into the Identification and Management of Functional Movement Impairments. Clin Neuropsychol, 7: 224.

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indicate that FMD patients may have a diminished sense of agency over their actions, and increased body-focused attention does not mitigate the sensory consequences of their movements [7].

## Discussion

Evidence for temporoparietal junction hypo function has been found in previous functional imaging studies of FMD patients. This area is thought to be crucial for comparing actual and expected sensory feedback during movement, which in turn affects the sense of agency for movement. Additionally, abnormal connectivity between the limbic and motor regions has been demonstrated.

Following the Freudian hypothesis of repression of psychological conflict and conversion of symptoms into physical disability in functional disorders. Utilizing the Life altering Situations and Challenges Timetable to distinguish extreme life altering situations and break occasions in 12 people with transformation confusion and 13 controls, the scientists got insights concerning serious life altering situations, get away from occasions, and an impartial occasion from a similar time span to create 72 explanations [8]. To maximize immersive recall when later asked in the fMRI setting if statements were true or false, 25% of the statements were made incorrect by changing details. Blocks of 8 proclamations were introduced in irregular request by condition, for which members needed to answer assuming every explanation was valid or misleading. Response times for valid or bogus reactions were recorded, and members were approached to rate how disturbing the block of proclamations was utilizing a visual simple scale [9]. When patients and controls were compared during recall in the withdrawal and severe states, functional MRI revealed increased activity in the left dorsolateral prefrontal cortex and decreased activity in the hippocampus and parahippocampus, indicating memory suppression. Even though the threat levels were comparable, escape events were perceived as being less problematic than severe events and elicited significantly longer response times than neutral events [10]. The right parietal junction and right supplementary motor cortex, which are involved in motor execution and sensory integration, saw an increase in activity in tandem with these shifts. These studies, taken together, highlight the FMD's neural correlates and life events that may influence the disease's underlying neurobiology.

## Conclusion

The recognition of FMD represents a significant advancement in

both research and clinical care for patients experiencing functional neurological symptoms. This resurgence of interest mirrors historical trends in neuroscience, reminiscent of the late 19th century when similar phenomena garnered considerable attention. However, despite these advancements, many neurological patients still lack access to structured care and treatment, leading to increased disability and diminished quality of life. Thus, further exploration and development in the field of FMD are crucial for addressing these unmet needs and improving patient outcomes.

## Acknowledgement

None

## Conflict of Interest

None

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