



Rehabilitation for Functional Neurological Disorder: A Structured Evidence Synthesis of Global Programs and Outcome Measurement Approaches

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- Received Date: 16 Apr 2026
- Accepted Date: 27 Apr 2026
- Publication Date: 30 Apr 2026

Keywords

Functional rehabilitation, Neurological disorder, behavioural therapy, cognitive outcome measurement, multidisciplinary care.

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Abstract

Functional Neurological Disorder (FND) is increasingly recognised as a treatable condition, with rehabilitation emerging as a central therapeutic approach. However, global rehabilitation models vary widely, and outcome measurement remains inconsistent. This structured evidence synthesis summarises international rehabilitation programs for FND and maps the outcome measures used to evaluate them against recommended FND outcome domains. Using predefined eligibility criteria, the review integrates findings from existing systematic reviews, randomised controlled trials (RCTs), and representative cohort studies. Intensive physiotherapy and occupational therapy programs demonstrated consistent pre-post improvements in motor symptoms and functional mobility. Multidisciplinary outpatient programs showed moderate improvements across symptom severity, mobility, mood, and quality of life. The strongest causal evidence came from an RCT demonstrating that combined physiotherapy and cognitive behavioural therapy significantly improved quality of life and symptom outcomes compared with psychological support. Outcome measures varied widely, though many aligned with recommended domains such as symptom severity, disability, quality of life, psychological distress, and global impression of change. Rehabilitation is effective for FND across multiple international models, though methodological heterogeneity and inconsistent outcome measurement limit comparability. Adoption of standardised outcome domains and validated tools is essential to strengthen future research and support scalable, evidence based rehabilitation pathways.

Introduction

Functional Neurological Disorder (FND) is a common and disabling condition characterised by motor, sensory, and seizure like symptoms that are incongruent with recognised neurological disease yet arise from genuine disturbances in brain network functioning. Contemporary neurobiological models emphasise abnormalities in predictive processing, attention, agency, and emotion-motor integration, providing a mechanistic rationale for rehabilitation based treatment approaches. As diagnostic clarity has improved, so too has recognition that FND is treatable, particularly through structured physiotherapy, occupational therapy, psychological interventions, and multidisciplinary rehabilitation.

Over the past decade, a diverse range of rehabilitation programs has emerged internationally, including intensive physiotherapy/occupational therapy protocols, multidisciplinary outpatient programs, inpatient/day hospital rehabilitation, and combined physiotherapy plus cognitive behavioural therapy (CBT) models. These programs vary widely in

duration, intensity, theoretical orientation, and professional composition. Although many report favourable outcomes, the evidence base remains fragmented, with heterogeneity in study design, patient populations, and critically outcome measures.

A major systematic review of outcome measurement in FND highlighted the lack of standardisation across studies and recommended a core set of domains including symptom severity, physical functioning, quality of life, psychological distress, and global impression of change [1]. Despite these recommendations, rehabilitation studies continue to employ a wide array of scales, limiting comparability and hindering meta-analytic synthesis.

Given the rapid expansion of rehabilitation models and the parallel need for consistent outcome measurement, a structured synthesis of global rehabilitation programs and the tools used to evaluate them is timely. This review aims to

1. describe and synthesise the evidence for rehabilitation programs for FND across the globe, and

Citation: Bala V. Rehabilitation for Functional Neurological Disorder: A Structured Evidence Synthesis of Global Programs and Outcome Measurement Approaches. *Neurol Neurosci.* 2026;7(1):050.

- map the outcome measures used in these studies to recommend FND outcome domains.

Methods

Design

This study is a structured evidence synthesis integrating elements of a systematic review, including predefined eligibility criteria, a conceptual search strategy, and structured data extraction. Because a full database search cannot be executed here, the review draws on existing systematic reviews, key clinical trials, and representative cohort studies..

Eligibility Criteria

Population

Adults (≥ 18 years) diagnosed with FND, including functional movement disorder (FMD), functional motor disorder, psychogenic nonepileptic seizures (PNES), or mixed presentations.

Interventions

Structured rehabilitation programs, including:

- Intensive physiotherapy and/or occupational therapy
- Multidisciplinary outpatient or inpatient rehabilitation
- Combined physiotherapy plus CBT or other integrated psychological interventions

Comparators

Usual care, waitlist, psychological support, or other active controls. Single arm cohorts were included for narrative synthesis.”

Outcomes

At least one of the following:

- Symptom severity
- Physical functioning/disability
- Health related quality of life
- Psychological distress
- Global impression of change

Study Designs

Randomised controlled trials (RCTs), non randomised controlled studies, prospective or retrospective cohorts, and service evaluations with pre–post data.

Data Extraction

A structured template captured:

- Study characteristics
- Sample characteristics
- Intervention details
- Outcome measures
- Results
- Limitations and risk of bias

Synthesis Approach

Given heterogeneity in interventions and outcomes, a narrative synthesis was conducted. Studies were grouped into:

- Intensive physiotherapy/OT programs
- Outpatient multidisciplinary programs
- Combined physiotherapy + CBT (RCT evidence)
- Psychotherapy led and PNES focused programs

Outcome measures were mapped to recommended FND outcome domains.

Results

Overview of Included Studies

The synthesis includes:

- One major systematic review of outcome measurement
- Representative intensive physiotherapy/OT cohorts
- A prospective 8 week multidisciplinary outpatient program
- A high quality RCT of physiotherapy + CBT
- Additional psychotherapy led PNES trials

Table 1. Summary of Rehabilitation Program Studies

Study	Design	Intervention	Sample	Outcomes	Key Findings
Nielsen et al. (2015)	Prospective cohort	5 day intensive PT	FMD	Motor severity, mobility	Significant pre–post improvement; sustained gains
Reid et al. (2022)	Retrospective cohort	5 day PT/OT	FMD	Motor severity, function	Clinically meaningful improvements
Guy et al. (2023)	Prospective evaluation	8 week multidisciplinary outpatient	Mixed FND	Symptom severity, mobility, QoL, mood	Moderate improvements
Macías García et al. (2024)	RCT	PT + CBT vs support	FMD	QoL, symptom severity, global change	PT+CBT superior
LaFrance et al. (2014); Goldstein et al. (2020)	RCTs	CBT based psychotherapy	PNES	Seizure frequency, QoL	Reduced seizures; improved QoL

Table 2. Outcome Measures Used Across Studies

Domain	Common Scales	Notes
Symptom severity	S FMDRS, PMDRS, seizure diaries	FND specific scales limited
Function/disability	WHODAS 2.0, FIM	Recommended for standardisation
Quality of life	SF 36, EQ 5D, QOLIE 31	QOLIE 31 for PNES
Psychological distress	PHQ 9, GAD 7, HADS	Widely validated
Global change	PGIC, CGI I	Essential for patient centred evaluation

Discussion

This structured evidence synthesis demonstrates that rehabilitation for FND is both feasible and effective, with consistent improvements in motor symptoms, functional mobility, psychological wellbeing, and quality of life across diverse program models. Intensive physiotherapy and occupational therapy programs show robust pre–post gains, while multidisciplinary outpatient programs offer broader improvements across functional and psychosocial domains. The strongest causal evidence comes from the recent RCT demonstrating that combined physiotherapy and CBT outperforms psychological support alone.

However, the evidence base remains limited by methodological heterogeneity. Most studies are single centre cohorts without control groups, and outcome measures vary widely. The systematic review of outcome measurement in FND underscores the need for standardisation, recommending a core set of domains and validated tools (Pick et al., 2020) [1]. Encouragingly, recent trials increasingly align with these recommendations.

Future research should prioritise standardised outcome sets, multi centre RCTs, long term follow up, health economic evaluations, and implementation studies.

Conclusion

Rehabilitation is a cornerstone of treatment for FND, with growing evidence supporting intensive physiotherapy, multidisciplinary programs, and integrated physiotherapy CBT models. Despite promising outcomes, heterogeneity in program design and outcome measurement limits comparability. Adoption of standardised outcome domains and validated tools will strengthen future research and support the development of scalable, evidence based rehabilitation pathways for FND worldwide.

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