

# Functional Neurological Disorder (FND)

Ryan Van Patten, PhD, ABPP-CN  
Kristen Mordecai, PhD  
Emmi Scott, PhD  
Erica Cotton, PsyD, ABPP-CN



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## Disclosures

- Navigating Neuropsychology (Podcast)

Continuing Education revenue, profit sharing with the International Neuropsychological Society



- Becoming a Neuropsychologist (Book)

Royalties from Springer



- VA Funding

VISN1 Career Development Award



- Editorial Service

Neuropsychology Associate Editor



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## Roadmap

### Functional Neurological Disorder (Van Patten)

- General Introduction to FND
- Concept 1: FND Subtypes have Shared Mechanisms
- Concept 2: FND is Inherently Biopsychosocial
- Concept 3: FND is Distinct from Feigning
- Concept 4: Cognition is Central to FND

### Functional Seizures (Mordecai)

- Diagnostic and Treatment Considerations
- Relevant Factors for Neuropsychologists
- Overview of National VA Program

### Functional Movement Disorder (Scott)

- Presentations and Diagnosis
- The Role of Neuropsychologists
- Evidence-Based Treatments

### Functional Cognitive Disorder (Cotton)

- Features and Mechanisms
- Distinguishing FCD from Neurodegenerative Disease
- Assessment and Treatment Recommendations

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Neurological signs/symptoms related to neural network dysfunction, not structural pathology  
(Hallett et al., 2022)

Also known as *conversion disorder*  
(APA, 2022; Zepf, 2015)

Present for thousands of years (Edwards et al., 2023)  
Recognized all over the world (Kanemoto et al., 2017)  
Prevalence ~140/100,000 (Finkelstein et al., 2024)

Occurs across the lifespan (Chouksey et al., 2019; Harris, 2019)  
More common in women than men (3 to 1 ratio)  
(Asadi-Pooya 2021; Rompere et al., 2021)

Symptoms are chronic and treatment resistant  
(Gelauff et al., 2014)

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Equivalent/worse QoL and disability compared to similar chronic conditions  
(Bianco et al., 2023; Kanalis et al., 2014)

Unemployment rate ~67% (Asadi-Pooya et al., 2021)

Annual individual cost: \$21,433 – \$86,722  
Annual total cost: > \$2 billion (Stephen et al., 2025)

Increased mortality (SMR = 2.5x)  
(Nightscales et al., 2020)

Overall public health impact rivals traditional neurological conditions (e.g., epilepsy, MS)  
(Asadi-Pooya et al., 2021; O'Mahony et al., 2023; Stephen et al., 2025)

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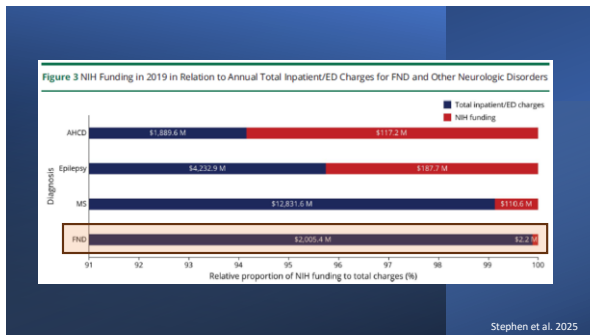
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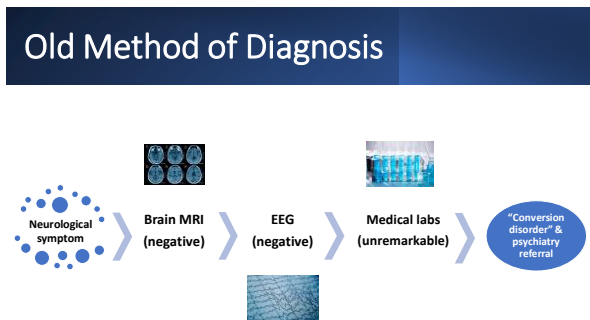
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## Modern Approach: Positive Signs for Diagnosis

- Positive signs allow for a rule in diagnosis.
- FND is not the result of ruling out other possibilities via negative medical tests.
- With positive signs, diagnoses of FND is accurate/stable over time (Stone et al. 2005, 2009).
- Rates of misdiagnosis are low (Gelauff et al. 2019; Walz et al. 2019).
- Accurate diagnosis has clinical benefits (Aybek & Perrot, 2022; O'Mahony et al. 2023).

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## Concepts

1. FND Subtypes have Shared Mechanisms

2. FND is Inherently Biopsychosocial

3. FND is Distinct from Feigning

4. Cognition is Central in FND

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## Concepts

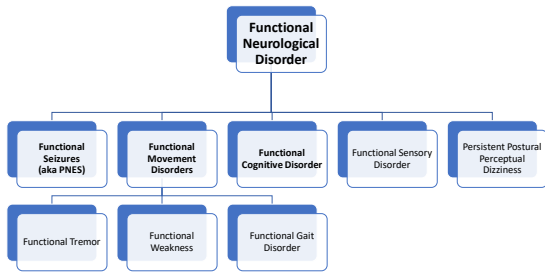
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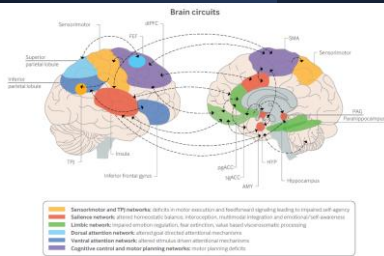
Van Patten &amp; Bellone 2024

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## Emerging FND Pathophysiology



Drane et al. 2021  
Perez et al. 2021  
Pick et al. 2019

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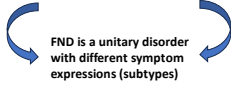
## Lumping versus Splitting

### Supports Lumping

- Shared pathophysiology/mechanisms  
(Drane et al. 2021, Hallett et al. 2022, Teasdale et al. 2018)
- Transdiagnostic presentations  
(Friedman & Popescu, 2021; Fongkietkiet et al., 2023)

### Supports Splitting

- Variation in symptoms across subtypes  
(Ruanayake et al. 2017, Kola & LaFrance, 2022, Martin et al., 2017)
- Unique treatment approaches  
(Goldstein et al. 2020, Maciuc-Gancibet et al. 2024, Van Pelt et al. 2024)



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## Concepts

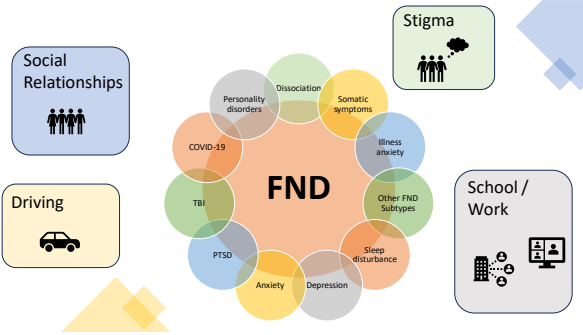
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Morbidity and mortality of nonepileptic seizures (NES): A controlled national study<sup>a, b, c, d, e</sup>  
Paul Jensen <sup>a, \*</sup>, Rikke Breen <sup>b</sup>, Jakob Kjellberg <sup>c</sup>  
<sup>a</sup> Center for Stop and Start, Department of Clinical Neurophysiology, Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark  
<sup>b</sup> Danish Epilepsy Center, University of Copenhagen, Copenhagen, Denmark  
<sup>c</sup> Danish National Institute of Public Health, Copenhagen, Denmark

**Danish National Patient Registry (1998-2013)**  
Functional seizures, n = 1,057  
Matched controls, n = 2,113

Health Condition	OR
Neurological	38.63
Mental health	15.45
Metabolic/endocrine	2.52
Infection	3.08
Visual	2.40
Ear, nose, throat	2.44
Cardiovascular	4.13
Respiratory	2.75
Gastrointestinal	2.75
Integumentary	2.52
Musculoskeletal	1.93
Abnormal clinical/lab findings	46.59

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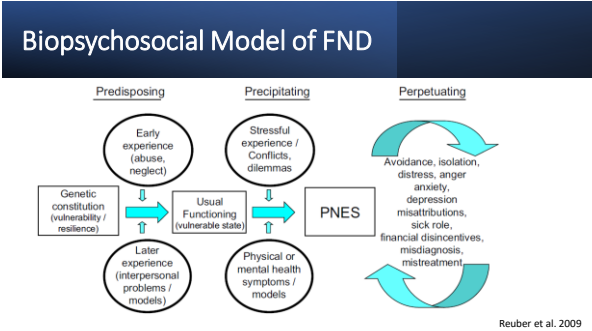
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## FND ≠ Feigning/Malingering

nature reviews neurology

<https://doi.org/10.1038/s41582-022-00765-1>

Perspective

[Check for updates](#)

### Why functional neurological disorder is not feigning or malingering

Mark J. Edwards<sup>1,2</sup>, Mahendra Yoganathan<sup>1,2\*</sup> & Jon Stone<sup>3</sup>

- Symptoms in FND are *genuinely experienced* (Hallett et al. 2022)
- Evidence: historical, cross cultural, epidemiological, neuroscientific, clinical
- FND and factitious disorder/malingering can co-occur

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Table 1 | Historical consistency of typical FND presentations

	FND presentation			
	Functional leg weakness	Functional dystonia	Functional facial dystonia	Functional seizures
Clinical features	Dragging gait with hip externally rotated	Clenched fist sometimes with wrist flexion	Ocular/ocular contraction and contralateral raised eyebrow	'Arc de-cercle' appearance
19th century				
21st century				

Edwards et al. 2023

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## Concepts

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## Concepts

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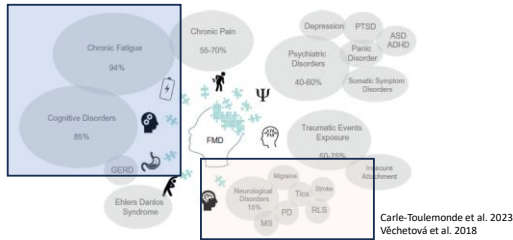
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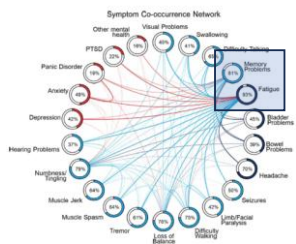
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## Cognitive Problems



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## Cognitive Problems



Butler et al. 2021

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## COGNITIVE TESTING

### Cognitive performance in functional seizures compared with epilepsy and healthy controls: a systematic review and meta-analysis

Neurology Focus, April 2024, Focus (Online), Copyright © 2024 Wolters Kluwer Health | Wolters Kluwer

**Summary**  
Background: Cognitive testing is a core component of functional seizures, but the literature on cognitive testing in functional seizures compared with epilepsy and healthy controls is limited. The purpose of this study was to systematically review and meta-analyze cognitive testing in functional seizures compared with epilepsy and healthy controls.

- Overall Hedge's  $g = -0.61$
- Worse performance in FS in all cognitive domains
- Largest difference in attention/processing speed;  $g = -0.69$

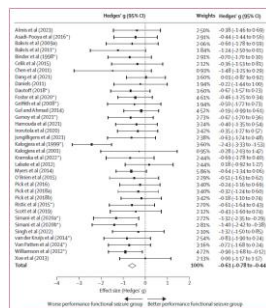



Figure 3 Forest plot comparing functional seizures with healthy or epileptic controls on overall cognitive performance (n = 44 studies).  
Studies with a significant composite score. All studies that have an asterisk are referenced in the appendix 40-55.

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Journal of the International Neuropsychological Society (2024), 3-4  
doi:10.1017/S1551200123000493

**Short Review**

**The role of neuropsychology in the care of patients with functional neurological symptom disorder**

Ryan Van Patten<sup>1,2</sup> , Kristen Mordecai<sup>3</sup> and W. Curt LaFrance Jr.<sup>1,2,4</sup>

<sup>1</sup>Center for Neuroregeneration and Neurotechnology, VA Providence Healthcare System, Providence, RI, USA, <sup>2</sup>Department of Psychiatry and Human Behavior, Brown University, Providence, RI, USA, <sup>3</sup>Mc Maryland Health Care System, Baltimore, MD, USA and <sup>4</sup>Whale Island Hospital, Providence, RI, USA

- FND is a complex biopsychosocial disorder requiring a holistic approach to advance the field.
- Patients with FND have frequent cognitive difficulties that are closely linked to quality of life.
- Neuropsychologists have a clear role in assessment and treatment of FND as part of interdisciplinary teams.

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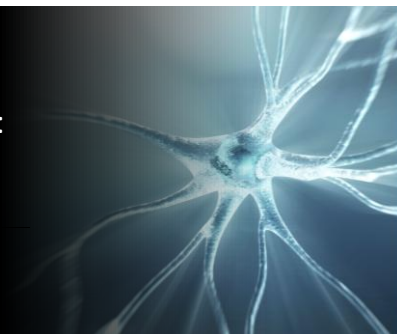
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**Next Topic:**  
**Functional Seizures**

Kristen Mordecai, PhD



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## PSYCHOGENIC NONEPILEPTIC SEIZURES

KRISTEN MORDECAI, PH.D.

VA MARYLAND HEALTH CARE SYSTEM / NEUROPSYCHOLOGY SECTION

VA NATIONAL EXPERT CONSULTATION & SPECIALIZED SERVICES / TELE-SEIZURES CLINIC

VA MIND BRAIN PROGRAM

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## AGENDA: PSYCHOGENIC NON-EPILEPTIC SEIZURES (PNES)

- Diagnostic & treatment considerations
- Relevant factors for neuropsychologists
- Overview of a national VA program for PNES (and other functional neurological disorders)



\* I have no conflicts of interest to disclose.

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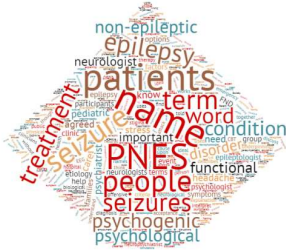
## SEIZURE CLASSIFICATION

- **Epileptic seizures (ES)** = recurrent seizures due to excessive disorderly discharges of cerebral neurons (seen as epileptiform discharges on EEG)
- **Physiologic nonepileptic events (PNEE)** = neither epileptic nor psychogenic
  - associated with systemic alterations that produce a seizure (i.e., medical or metabolic cause)
- **Psychogenic nonepileptic seizures (PNES) or Functional seizures** = events that appear to be epileptic but with no EEG correlate (i.e., no abnormal electrical discharge)

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## NOMENCLATURE

- Why “psychogenic”?
- Why “seizure”?
- Avoid outdated terms (pseudo-seizures, hysterical seizures) and use the correct diagnostic category



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## EPIDEMIOLOGY



**Of 1% of US population with epilepsy**  
 20% of patients presenting at Level 3 Epilepsy Centers (25-33% of EMU admissions)  
 Up to 25% of Veterans evaluated for epilepsy have PNES (~7,000 Veterans)  
 Co-occurrence of PNES and ES = <10%



**Higher estimates of PNES have been recently reported...**  
 Differences in referral patterns  
 Increased monitoring of patients with possible PNES  
 Possibly even increased PNES rates

Dane et al., 2016; LaFrance, et al., 2014; LaFrance et al., 2020; Salinsky et al., 2019

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## CHARACTERISTICS



- Women (75%)
- Onset typically 20-30 years old
- Psychiatric comorbidity
  - Depression (36-80%), SI/SA common
  - Anxiety (9-71%)
  - Trauma history (childhood abuse common) (~80%) / PTSD (38-64%)
  - Borderline PD (10-62%)
  - Alexithymia common

Rush-Payne et al., 2021; Benarroch & Kanter, 2018; Myers et al., 2014

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## GOLD STANDARD DIAGNOSIS



- Neurologist cannot trust history or observation only
- EEG monitoring: demonstrate absence of epileptiform discharges during typical event
  - Usually requires inpatient video-EEG monitoring in epilepsy monitoring unit (EMU)

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## PNES DIAGNOSTIC LEVELS OF CERTAINTY

Table 2. Overview of proposed diagnostic levels of certainty for psychogenic nonepileptic seizures

	History	Witnessed event	EEG
Diagnostic Level			
Possible	+	By witness or self-report/description	No epileptiform activity in routine or sleep-deprived interictal EEG
Probable	+	By clinician who reviewed video recording or in person, showing semiology typical of PNES	No epileptiform activity in routine or sleep-deprived interictal EEG
Clinically established	+	By clinician experienced in diagnosis of seizure disorders (on video or in person), showing semiology typical of PNES, while not on EEG	No epileptiform activity in routine or ambulatory ictal EEG during a typical ictus/event in which the semiology would make ictal epileptiform EEG activity expectable during equivalent epileptic seizures
Documented	+	By clinician experienced in diagnosis of seizure disorders, showing semiology typical of PNES, while on video EEG	No epileptiform activity immediately before, during or after ictus captured on ictal video EEG with typical PNES semiology

Key: +, history characteristics consistent with PNES; EEG, electroencephalography (as noted in the text, additional tests may affect the certainty of the diagnosis—for instance, self-protective maneuvers or forced eye closure during unresponsiveness or normal postictal prolactin levels with convulsive seizures).

Lafont, Bhat, et al., 2013

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## (MIS)DIAGNOSIS

\* Definitive diagnosis delayed by an average of 7 years \*

- Misdiagnosis of presumed epilepsy
  - continued use of anti-epileptic medications
  - not receiving appropriate treatment
- Morbidity
- Worsening of symptoms
- Cost to patients
- Ongoing caregiver burden
- Cost to health care system
- \*latrogenic injury\*



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### CLINICIAN RESPONSIBILITY

How healthcare providers contribute to poor prognosis:

- Lack of understanding
- Lack of communication
- Lack of clinician ownership
- Lack of empathy?

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### COMMON REASONS FOR REFERRAL TO NEUROPSYCHOLOGY

Part of seizure work-up/while on EMU

Subjective cognitive complaints

Assistance with case formulation/diagnosis/recommendations

Treatment

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### ROLE OF NEUROPSYCHOLOGY

Psychometric testing...??



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### ROLE OF NEUROPSYCHOLOGICAL TESTING

- Cognitive testing not helpful for diagnosis
  - PNES > ES: global cognition, language
  - Healthy Controls > PNES: across domains (driven by attn/proc sp?)
  - PNES = ES: invalid PVT rates similar
- >80% PNES have cognitive complaints in daily life
  - Cognitive testing appropriate and helpful
  - Recommendations: brain health, compensatory strategies, and treatment planning



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### ROLE OF NEUROPSYCHOLOGICAL TESTING

- Personality and symptom measurement may be helpful for treatment and conceptualization
  - No consistent differences between PNES and ES to differentiate for diagnostic purposes
  - Trauma hx, PTSD, and personality disorders **may** be distinguishing factors
  - Alexithymia, emotion dysregulation, somatization, and avoidance are common



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### ROLE OF NEUROPSYCHOLOGY...BEYOND COGNITIVE ASSESSMENT

- Case formulation/determine underlying psychiatric comorbidities
- Ensure clear communication of PNES diagnosis to patient, family and other providers
- Promote acceptance of the diagnosis
- Develop treatment plan
- Provide referral or treatment



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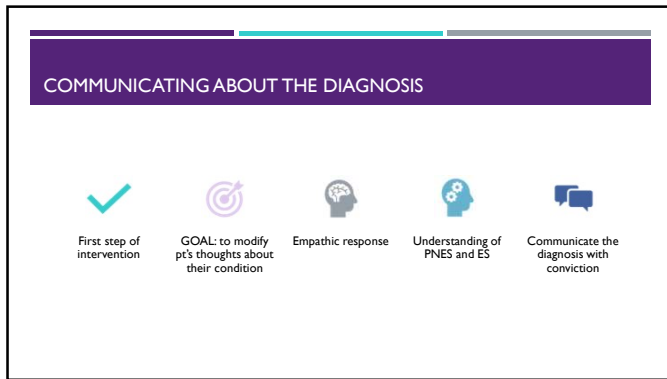
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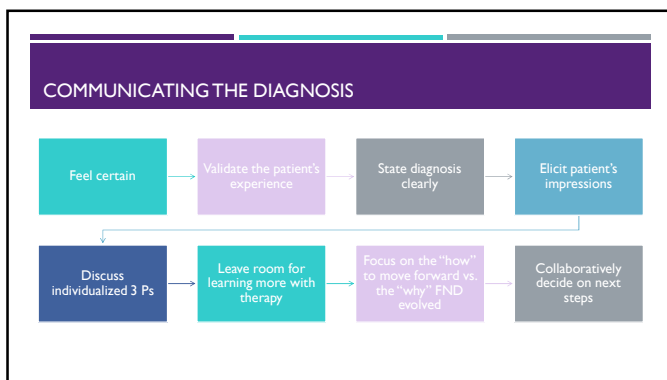
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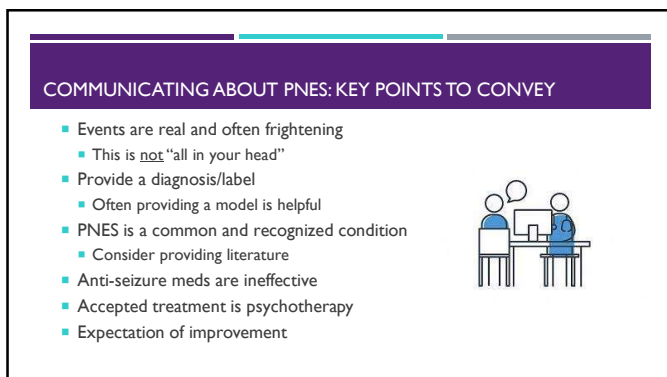
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### TREATMENT FOR PATIENTS WITH PNES...WHO/WHEN/WHAT?

- Who is responsible for treating these patients?  
Neurology? Psychiatry? Mental Health?
- A multi-disciplinary team is recommended.
  - Includes regular f/u with neurologist/epileptologist
- Initiate treatment asap.
- Psychotherapy is indicated treatment.

WHAT'S  
NEXT?

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### TREATMENT INTERVENTIONS



- CBT: most studied and highest efficacy
- Other modalities remain understudied
- Depending on FND symptoms, other specialties may be indicated (PT, OT, Psychiatry)

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### VA MIND BRAIN PROGRAM

- National VA initiative focused on functional neurological disorder (FND) education and research
- VA supports the use of neuro-behavioral therapy (NBT) for PNES
- Mind Brain training program includes:
  - TRAIN/TMS courses (8.5 CEs)
  - 1:1 individualized training & consultation
  - Community of Practice meetings



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THERAPEUTIC TOPICS, TARGETS & MODALITIES FOR NEURO-BEHAVIORAL THERAPY FOR SEIZURES			
Session	Chapter Title	Target	Psychotherapy Modality
Session Intro	Introduction for patients: understanding seizures	Describes epileptic and nonepileptic seizures	Psychoeducation
Session 1	Making the decision to begin the process of taking control	Patient makes the choice to engage in treatment	Motivational interviewing
Session 2	Getting support	Addresses communication styles and goals	Interpersonal therapy
Session 3	Deciding about your medication therapy	Discusses central nervous system medications	Psychoeducation
Session 4	Learning to observe your triggers	Examines physical, internal, and external triggers	CBT schema therapy
Session 5	Channeling negative emotions into productive outlets	Explores emotions, cognitions, and relieving actions	Dialectical behavior therapy
Session 6	Relaxation training	Teaches relaxation techniques	Cognitive behavior therapy
Session 7	Identifying your pre-seizure aura	Identifies aura using self-awareness techniques	Mindfulness
Session 8	Dealing with external life stresses	Addresses relational and psychosocial stresses	Psychodynamic
Session 9	Dealing with internal issues and conflicts	Examines past trauma and unconscious processes	Psychodynamic
Session 10	Enhancing personal wellness	Sets healthy lifestyle priorities	Self-efficacy/self-management
Session 11	Other seizure symptoms	Describes comorbid symptoms	Mindfulness
Final reading	Taking control: an on-going process	Provides perspective on life after treatment	Acceptance and commitment therapy

LaFrance, 2015, mod by Reiter, Taking Control of Your Seizures, 1987

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### NEURO-BEHAVIORAL THERAPY FOR SEIZURES

Randomized Clinical Trial<sup>®</sup>

- NBT-Sz with sertraline
  - sz reduction (51%), improved deprx, anxiety, and global functioning
- NBT-Sz without sertraline
  - sz reduction (59%), improved global functioning
- Tx as usual and sertraline only arms
  - No significant changes
- NBT is associated with improvements in general cognition and reduced cognitive concerns for those with both PNES and TBI<sup>®</sup>

<sup>®</sup>LaFrance et al., 2014, JAMA  
<sup>®</sup>Van Putten et al., 2021; Van Putten et al., 2024

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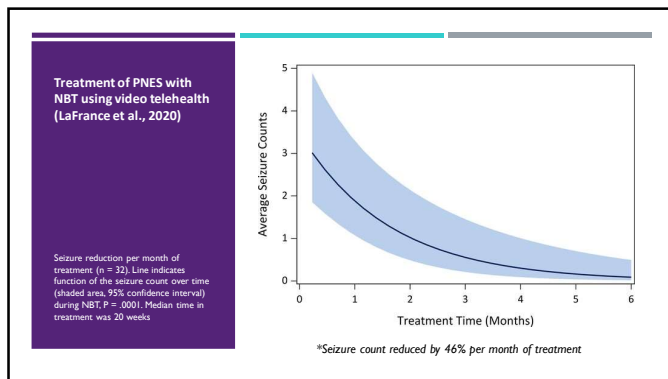
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**PREDICTIVE FACTORS**

- For poor outcome:
  - Longer duration of symptoms
  - Receipt of disability benefits
  - Previous psychiatric diagnoses/psychopathology
  - Interpersonal difficulties
- For positive outcome:
  - Higher educational attainment, IQ
  - Less somatization
  - Clear communication about diagnosis

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**PNES/FND RESOURCES**

Epilpsy & Behavior Reports

FND HOPE  
FUNCTIONAL NEUROLOGICAL DISORDER

FUNCTIONAL NEUROLOGICAL DISORDER SOCIETY

VA Mind Brain Program  
Courses via TMS & TRAIN:  
8 CEs available

FND Guide  
neurosymbols.org

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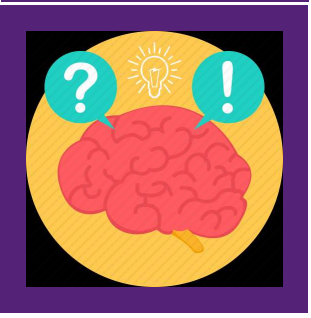
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THANK YOU FOR  
YOUR ATTENTION...

QUESTIONS OR  
COMMENTS?

[Kristen.Mordecai@va.gov](mailto:Kristen.Mordecai@va.gov)  
[VHAMindBrainProgram@va.gov](mailto:VHAMindBrainProgram@va.gov)

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# Functional Movement Disorders

Emmi Scott, PhD emmi.scott@inova.org

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## Agenda

- 1. Presentations of functional movement disorder (FMD)
- 2. Establishing a positive diagnosis
- 3. Evidence-based treatments
- 4. The role of neuropsychology

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## 1. Presentations of FMD

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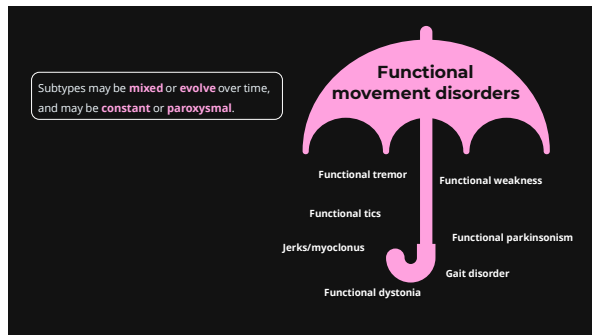
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The impact of non-motor symptoms on the health-related quality of life in patients with functional movement disorders

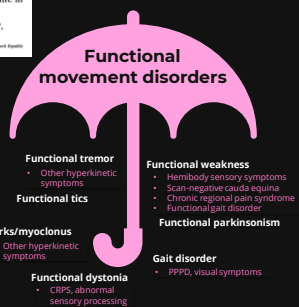
Gabriela Víchová<sup>1</sup>, Matěj Slovák<sup>2</sup>, David Kemlík<sup>3</sup>, Zuzana Hamšílková<sup>4</sup>, Pavel Dulák<sup>5</sup>, Tomáš Nikula<sup>6</sup>, Evžen Růžička<sup>7</sup>, Mark J. Edwards<sup>8</sup>, Tereza Serranova<sup>9</sup>

<sup>1</sup>Department of Neurology and Neurophysiology, General Hospital, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>2</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>3</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>4</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>5</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>6</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>7</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic; <sup>8</sup>Department of Neurology, Faculty of Medicine, Masaryk Memorial Cancer Institute, Prague, Czech Republic

**Common comorbidities among all FMDs:**

- Fatigue (~90%)
- Cognitive symptoms (~80%)
- Pain (>50%)
- Sensory processing issues
- Depression (50%)
- Anxiety (60%)
- PTSD (24%)

Non-motor symptoms are significant predictors of disability and quality of life, often more than motor symptoms.



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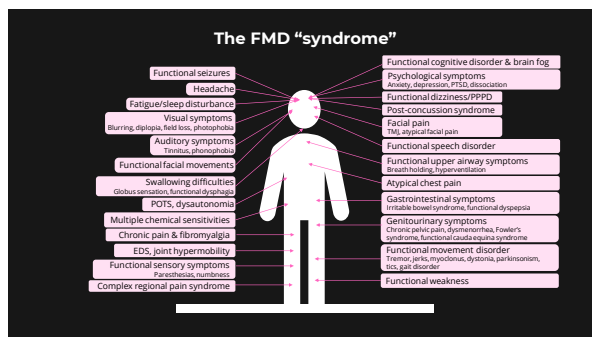
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## Demographic characteristics

Original research  
Functional movement disorder gender, age and phenotype study: a systematic review and individual patient meta-analysis of 4905 cases  
Geeth C. Chittenden, <sup>1,2</sup> Tessa J. Robinson, <sup>1,2</sup> Thomas E. Bock, <sup>3</sup> Jan Sauer, <sup>4</sup> FMD-GAP Study Group

- 3-6% or more of referrals to movement disorders neurologists
- 73% women overall
  - Facial symptoms = 83.6%
  - Dystonia = 78.4%
  - Jerks/myoclonus = 63.7%
  - Parkinsonism = 51.8%
- Mean age of onset = 39.6 ± 16
  - Dystonia = 34.5
  - Gait = 43.2
  - Parkinsonism = 44.6

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## Neurological comorbidities

- Present in 17-25% of individuals with FMD
- FMD typically occurred after the onset of neurological disease, with the exception of parkinsonism
- Tremor and paroxysmal presentations of FMD more commonly associated with comorbid neurological disorder

Tinazzi et al., 2020

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## Neuropsychiatric phenotypes

Activity/fear avoidance	Emotional avoidance	'Go-go-go' coping style	SNS hyperarousal/somatic anxiety	Low self-agency/self-efficacy
Propensity to dissociate	Somatic preoccupation/health anxiety	Cluster B personality traits	People pleasing	Perfectionism/OCPD

Gilmour et al., 2023

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### FMD and FS: Two sides of the same coin?

	Functional movement disorders	Functional seizures
<b>Symptoms</b>	Always motor, sometimes paroxysmal	Sometimes motor, always paroxysmal
<b>Demographics</b>	Onset in middle age, predominantly female, but M>F in myoclonus	Younger age of onset, predominantly female
<b>Comorbidities/Etiological factors</b>	(Organic) movement disorders, increased perfectionism, somatic hypervigilance, avoidance	Epilepsy, neuroticism, borderline personality disorder, & childhood trauma
<b>Diagnosis</b>	Made by movement disorders neurologist based on positive exam signs (phenotype-specific) and supportive clinical history	Made by epileptologist based on vEEG, semiology, and supportive clinical history
<b>Treatment</b>	Explanation + rehabilitation therapies	Explanation + psychotherapy
<b>Prognosis</b>	Variable, usually chronic	Variable, usually chronic

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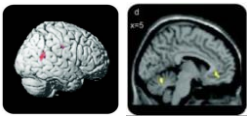
## 2. Pathophysiology and Etiology

Brief overview of the "how" and "why"

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### The involuntary nature of conversion disorder

Neurology, 2020 V. Voon, MD



#### Why functional neurological disorder is not feigning or malingering

Mark J. Edwards<sup>1,2</sup>, Maheshwari S. R. (2020) | [View this article](#)  
*Nature Reviews Neurology* 16: 240–254 (2020) | [View this article](#)

fMRI comparison of volitional tremor vs. functional tremor:

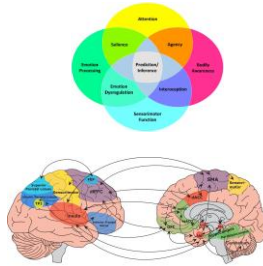
- **Decreased right TPJ activity** during functional – but not volitional – tremor. (TPJ is associated with **sense of agency** over one's actions.)
- **Decreased functional connectivity** between TPJ, motor/somatosensory regions, and attention networks.
- **Hyperconnectivity** between areas involved in emotion processing and motor preparation

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## Pathophysiology (the “how”) of FMD

Functional network alterations in:

- Sensorimotor & self-agency
- Interoception
- Emotion regulation/processing
- Attention processes
- Motor planning



Drane et al., 2021; Perez et al., 2020; Weber et al., 2022

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## Etiology (the “why”) of FMD

Bio-psycho-social model



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### 1. Predisposing factors:


- Genetics
- Female sex
- Neurological disorder
- Comorbid functional disorders (IBS, CFS, pain)
- Mood, anxiety, trauma disorders
- Propensity to dissociate
- Alexithymia
- Perfectionism/OCPD
- Neuroticism
- Childhood abuse
- Trauma history
- Health beliefs



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- Health beliefs



**2. Precipitating event:**

- Concussion → Functional cognitive disorder
- Syncope → Functional seizures
- Vestibular pathology → Functional dizziness
- Limb injury → Functional dystonia or weakness
- Panic attack → Functional tremor
- Job loss
- Other stressor

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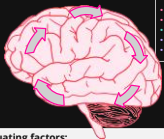
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- Job loss
- Other stressor

**3. Perpetuating factors:**

- Neuroplasticity
- Entrenched abnormal motor programs
- Chronic pain and fatigue
- Sensitization
- Negative expectations & low self-agency
- Fear of/hypervigilance to symptoms
- Catastrophizing
- Avoidance patterns
- Diagnostic uncertainty
- Feeling misbelieved
- Iatrogenesis
- Reinforcement from family
- Compensation seeking

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## 2. Diagnosis of FMD

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## Making a Rule-In Diagnosis

- Diagnosis is typically made by a movement disorders neurologist based on **positive signs** on exam and history that demonstrate:

**Inconsistency:** Variability of symptoms over time/situation/task, usually between performance in a voluntary versus an automatic scenario

**Distractibility:** suppression of symptoms during another cognitive or motor task, and/or worsening of symptoms with attention to the affected body part

**Incongruence** with recognized neurological diseases or "laws" of anatomy and physiology

- Diagnosis can be made reliably from clinical exam, with only a 4% misdiagnosis rate.

Wahli et al., 2019

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## Positive signs: Functional weakness

Patwal et al., 2023 Diagnostic accuracy of clinical signs and investigations for functional weakness, sensory and movement disorders: A systematic review

### Hoover's sign

- Hip extension is weak on direct testing when asked to push down.
- Hip extension returns to normal when asked to lift contralateral leg.

86-97% Sn, 96-100% Sp



### Hip abductor sign

- Hip abduction is weak to direct testing.
- Hip abduction is present when instructed to abduct the contralateral hip against resistance.

100% Sn, 100% Sp



### Drift without pronation

- Patience lifts both arms outstretched with palms up
- Weak arm drifts downward but does not pronate

61-100% Sn, 93-95% Sp



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## Hoover's sign for functional leg weakness

### Left Functional Hemiparesis

Positive right leg Hoover sign in a 41-year-old woman who developed acute right facial spasm and a right hemiparesis and was initially thought to have had a stroke.

CONTINUUM

AMERICAN ACADEMY OF  
NEUROLOGY

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## Positive signs: Functional tremor



### Entrainment:

- Tremor adopts the rhythm of a paced volitional movement performed in another body part (e.g., finger tapping or hand opening/closing in the other hand). Vary the rate of your tapping and check that the patient's voluntary tapping matches your frequency.

### Variability/Distractibility:

- Marked variability in tremor frequency, rhythmicity, and axis. Improvement or resolution with motor distraction (e.g., finger tapping, ballistic movements with contralateral hand) or cognitive distraction (e.g., months backward, serial 7s)

### Whack-a-mole sign:

- Suppression of tremor or jerky movements in one body part by the examiner induces tremor/abnormal movements in another body part.

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## Entrainment and distractibility in functional tremor

Entrainment to an externally cued rhythm

Cessation of tremor with ballistic movement

Variability of tremor amplitude, frequency, & axis



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## Positive signs: Functional gait disorders

- Non-economical postures (astasia abasia) with exaggerated compensatory movements appearing unstable; however, compensatory movements demonstrate good balance/strength
  - Knee buckling without falls
  - "Walking on ice" or "tightrope" gait
  - Dragging monoplegic gait
- Motor inconsistency: Impaired forward gait but intact backward gait or running \*\*
- "Huffing & puffing" sign
- "Swivel chair" sign



Exaggerated compensatory movements (falling arms/trunk) with prolonged single-leg stance during tandem gait

Motor inconsistency with preservation of automatic movements (skating)



Nonnekes et al., 2020; Lagrand et al. 2023

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### Functional gait disorder: Examples of inconsistency



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### Positive signs: Functional dystonia

- Fixed posture at onset
- Unilateral downward lip pulling, ipsilateral jaw deviation, and platysma contraction
- Flexion of 3-5<sup>th</sup> digits with sparing of pincer function
- Foot inversion and plantar flexion, flexion of toes



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### Historical clues to the diagnosis of FMD



Abrupt onset, often associated with a triggering event



Rapid progression to maximum symptom severity



Variability over time



Periods of spontaneous remissions



Unusual evolution of symptoms over time



Multiple undiagnosed conditions

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### 3. Treatment

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#### Step 1 of treatment: Explain the diagnosis



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#### Step 1 of treatment: Explain the diagnosis

Name the diagnosis.  
Don't just say what  
they don't have.

"You have a functional tremor."

Diagnostic delays → Higher healthcare utilization and costs

Cuoco et al., 2022

Good diagnostic explanation → 31% decrease in healthcare costs

Lagrand et al., 2023

All tests were normal.

able to communicate with your body normally.

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## Step 2: Provide educational material



Printable fact sheets from  
[www.neurosymptoms.org](http://www.neurosymptoms.org)

Also recommended:  
<https://fndportal.org> and  
[www.fndhope.org](http://www.fndhope.org)

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## Treatment should be multidisciplinary

Contents lists available at ScienceDirect

**Seizure**

Journal homepage: [www.elsevier.com/locate/seizure](http://www.elsevier.com/locate/seizure)

**Psychological interventions for psychogenic non-epileptic seizures: A meta-analysis**

Perrin Caruso<sup>a</sup>, Katherine Nicholson Perry<sup>a</sup>

*Annals of Clinical Psychiatry* (June 15, 2015) 27(6): 488–494

**Occupational therapy consensus recommendations for functional neurological disorder**

Clare Nicholson<sup>a,1</sup>, Mark J Edwards<sup>2</sup>, Alan J Carson<sup>3</sup>, Paula Gardiner<sup>4</sup>, Dawn Godkin<sup>5</sup>, Kate Hayward<sup>6</sup>, Susan Humblestone<sup>7</sup>, Helen Inada<sup>8</sup>, Carrie Lumsden<sup>9</sup>, Julie Macrae<sup>10</sup>, Lynne Mann<sup>11</sup>, Lindsay Macgregor<sup>12</sup>, Glenn Nielsen<sup>13</sup>, Louise Oakley<sup>14</sup>, Jason Price<sup>15</sup>, Jessica Randolph<sup>16</sup>, Jasbir Rana<sup>17</sup>, Ed Sme<sup>18</sup>, Jon Stone<sup>19</sup>

**Physiotherapy for functional motor disorders: a consensus recommendation**

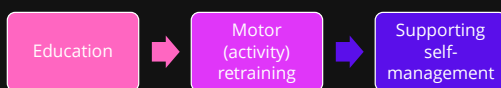
Glenn Nielsen<sup>1,2</sup>, Jon Stone<sup>3</sup>, Audrey Matthews<sup>4</sup>, Madeline Brown<sup>5</sup>, Chris Sparkes<sup>6</sup>, Ross Farmer<sup>7</sup>, Lindsay Masterton<sup>8</sup>, Lacey Duncan<sup>9</sup>, Alisa Winters<sup>10</sup>, Laura Durrall<sup>11</sup>, Carrie Lumsden<sup>12</sup>, Alan Carson<sup>13</sup>, Anthony S Davis<sup>14</sup>, Mark Edwards<sup>15</sup>

**Management of functional communication, swallowing, cough and related disorders: consensus recommendations for speech and language therapy**

Janet Baker<sup>16</sup>, Caroline Barrett<sup>17</sup>, Lesley Cawthra<sup>18</sup>, Maria Dietrich<sup>19</sup>, Emma Dixon<sup>20</sup>, Joseph H Duddy<sup>21</sup>, Anne Ellis<sup>22</sup>, Dawn E Foster<sup>23</sup>, Jennifer Freeman<sup>24</sup>, Catherine Gregory<sup>25</sup>, Kirsty McKeown<sup>26</sup>, Nick Miller<sup>27</sup>, Jo Pattison<sup>28</sup>, Carole Roth<sup>29</sup>, Helen Roy<sup>30</sup>, Jennifer Short<sup>31</sup>, Rene Ustunali<sup>32</sup>, Willem van Merbergen<sup>33</sup>, Anne Vertigan<sup>34,35</sup>, Alan Carson<sup>36</sup>, Jon Stone<sup>37</sup>, Laura McWhirter<sup>38</sup>

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## Key components of treatment across providers

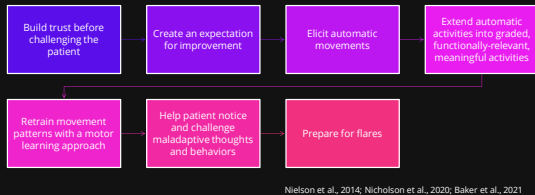


Nielson et al., 2014, Consensus guidelines; Gardiner, Maggio, & Nielson in LaFaver, 2022

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### Key components of treatment across providers



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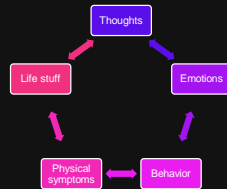
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### Common elements of therapy for FMD

1. Psychoeducation:
  - Normal movement is possible
  - Biopsychosocial formulation
  - Relationship between thoughts, emotions, behaviors, & FMD
  - Fight/flight response
2. Address expectations, beliefs, perceptions
3. Behavioral intervention
4. Regular homework
5. Relapse prevention



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### Goals of CBT-based psychotherapy for FMD

- Target relevant perpetuating factors
- Learn to regain control over symptoms
- Learn to identify triggers or improve predictability of symptoms
- Challenge unhelpful or catastrophic beliefs about symptoms
- Reduce distress about symptoms
- Reduce impact of symptoms on daily life/re-engage in normal activities

*Goal is not necessarily to "eliminate" FMD symptoms, BUT goals should be clearly relevant to FMD symptoms.*

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## 4.

## Role of the neuropsychologist

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### Role of the neuropsychologist in FMD

#### Assessment

- Neuropsychological evaluations for cognitive complaints
- Assess psychiatric comorbidities
- Triage for therapy

#### Treatment

- Psychoeducation
- Validation/addressing prior invalidation
- Biopsychosocial formulation
- Psychotherapy
- Multidisciplinary collaboration

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### Assessment



#### History taking

- Comprehensive list of symptoms
- Onset and evolution of symptoms
- Predisposing traits, precipitating events, and perpetuating factors
- Impact on daily functions



#### Behavioral observations, including clear documentation of positive signs

- Distractibility
- Worsening with attention
- "Huffing & puffing" sign



#### Cognitive assessment

- Identify positive signs of FCD
- Rule out neurocognitive disorder
- Identify contributing factors to cognitive complaints that can inform treatment



#### Assess readiness for therapy

- Motivation
- Diagnostic agreement
- Expectations for improvement
- Ongoing investigations
- Comorbidities
- Compensation seeking/litigation

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## Cognitive functioning in FMD

- o No consistent cognitive profile
- o Mixed evidence for deficits in attention and executive functioning
- o Cognitive symptoms correlate with psychiatric symptoms
- o Many confounding factors, including premorbid IQ, education, performance validity testing, medication use
- o Failed PVTs in a minority of patients
- o Invalid or very elevated symptom validity scales common

Pick et al., 2023; Millman et al., 2024

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## Pitfalls in neuropsychological assessment of FMD

- o Neuropsychological evaluations cannot diagnose FMD
- o Do not overpathologize low scores
- o Do interpret low scores in the context of base rates and known medical/psychosocial history and plausible mechanisms
- o Do not attribute every weakness to FND
- o Do not assume invalid performance = malingering



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## Conclusions

- o FMD can be diagnosed reliably based on positive signs.
- o Multidisciplinary treatment is the gold standard.
- o Neuropsychologists have a key role in assessment and treatment of FMD.

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## Functional Cognitive Disorders Diagnosis, Mechanisms & Treatment

Erica Cotton (nee Sieg), PsyD, ABPP-CN  
AACN June 2025  
Chicago, IL

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Disclosures: None  
COI: None

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### Background & Pathway To Specialization

- Internship
  - University of Miami Miller Medical School: Ryder Trauma Center
  - Neuropsychology: Neurorehabilitation, Psychotherapy, Cognitive Assessment, Inpatient Consultation
- Fellowship
  - Northwestern University Feinberg School of Medicine
  - Inpatient Consultation Hospital Wide (Emphasis on EMU / Epilepsy & Neurosurgery)
- Faculty Appointment
  - Northwestern Medicine (Epilepsy & Movement Disorders Primary)
    - Surgical & Functional Neurological Programs
  - Functional Neurologic Disorders Post-Graduate Training
    - Mentorship with W. Curt LaFrance, Jr.
  - Founding Member of the International Functional Neurologic Disorders Society

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## Overview: FCD Diagnosis, Mechanisms & Treatment

- Cognition in FND
- FCD Diagnostic Features
- FCD Proposed Mechanisms
- FCD vs Neurodegenerative Disease & Other Key FCD Publications
- FCD Treatment

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## FND: Updated Emotional Mechanisms

Rationale for Neuropsychology Involvement

<https://doi.org/10.1093/brain/awc304>

BRAIN 2022; 0: 1–16 | 1

**BRAIN**  
REVIEW ARTICLE



### A new science of emotion: implications for functional neurological disorder

Johannes Junglligens,<sup>1,2,†</sup> Sara Paredes-Echeverri,<sup>2,†</sup> Stoyan Popkirov,<sup>1</sup> Lisa Feldman Barrett,<sup>3,4,5,†</sup> and David L. Perez,<sup>2,5,6,†</sup>

Reformulating FND Using the Theory of Constructed Emotion

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## FND: Updated Mechanism

Rationale for Neuropsychology Involvement

Reformulating FND Using the Theory of Constructed Emotion

- Proposal 1: Chronic [allostatic] energy mismanagement in FND [via inefficient use of emotional concepts]  
 Proposal 2: FND can occur in the context of aberrant emotional construction  
 Proposal 3: Altered prediction error learning in FND  
 Proposal 4: Alexithymia, 'panic attack without panic' and dissociation in FND can be reframed  
 Proposal 5: Theory of constructed emotion helps to contextualize the debate on emotion in FND  
 Proposal 6: Repertoire of [emotional] concepts / refinement is negatively affected by adverse life experiences

1 | BRAIN 2022; 0: 1–16

J. Junglligens et al.

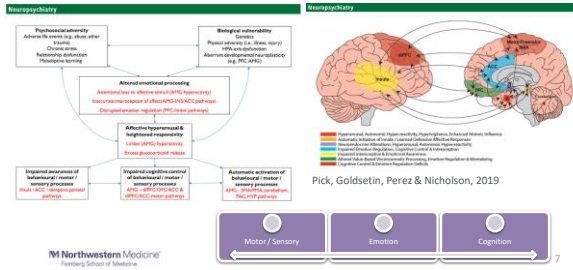


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## FND: Updated Mechanism

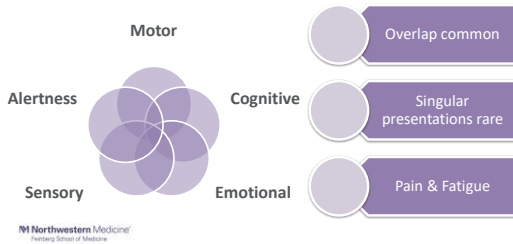
Rationale for Neuropsychology Involvement



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## Functional Neurologic Disorder: Symptoms

Vary by FND Subtype: FS, FMD, FCD, PPPD, Sensory, Etc.



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## Overview: FCD Diagnosis, Mechanisms & Treatment

- Cognition in FND
- **FCD Diagnostic Features**
- FCD Proposed Mechanisms
- FCD vs Neurodegenerative Disease & Other Key FCD Publications
- FCD Treatment

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### Functional Cognitive Disorder: Diagnostic Criteria

1. One or more symptoms of impaired cognitive function are present
2. Clinical findings show evidence of internal inconsistency: with observed or measured function, or between different situations
3. Symptoms or impairment are not better explained by another medical disorder, although might be comorbid with another medical disorder
4. Symptoms or impairment cause clinically substantial distress or impairment in social, occupational, or other important areas of function, or warrant clinical consideration

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Ball, et al; 2020  
McWhirter, King, McClure, Ritchie, Stone, & Carson; 2020 10

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### Functional Cognitive Disorder: Diagnostic Criteria

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McWhirter, King, McClure, Ritchie, Stone, & Carson; 2020 11

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### FCD Diagnostic Features

Cognitive concerns / complaints that are:

- Variable and inconsistent
- Consistent with normative cognitive lapses
  - OR Consistent with a FND type process
- Cause significant distress or disability

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### Typical FCD Presenting Concerns

<p><b>"Memory"</b></p> <ul style="list-style-type: none"> <li>• Attention driven inefficiency of encoding / retrieval</li> <li>• With out primary retentive memory impairment</li> <li>• <b>"Memory for Forgetting"</b> describing in detail the instances they had memory or cognitive lapses.</li> </ul>	<p><b>"Freezing"</b></p> <ul style="list-style-type: none"> <li>• Alexithymia</li> <li>• Emotional over-activation</li> <li>• Fight, Flight, <b>Freeze</b></li> <li>• When faced with cognitive effort, complexity, or decision making</li> <li>• Highly variable over task / time</li> <li>• Blanking on over-learned information</li> </ul>
<p><b>"Brain Fog"</b></p> <ul style="list-style-type: none"> <li>• Self-perceived slowing</li> <li>• Less efficient processing</li> <li>• Difficulty switching between tasks</li> </ul>	
<p><b>"Word Finding"</b></p> <ul style="list-style-type: none"> <li>• Word retrieval-based difficulty</li> <li>• With out pure semantic or phonemic language loss</li> <li>• Within a normal cognitive error or inefficiency range</li> </ul>	<p><b>[Procedural Errors]</b></p> <ul style="list-style-type: none"> <li>• "Autopilot" Errors</li> <li>• Distraction Based Errors</li> </ul>

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### Examples of FCD Presentations

- 45-year-old man with FCD following panic and dissociation during a presentation at work, now with obsessional symptoms, convinced he has Alzheimer and will surely lose his job
- A 62-year-old man who upon retirement became very concerned over normative cognitive lapses which his wife does not share
- A 52-year-old woman with FCD after Covid-19 and in the context of multiple somatic symptoms
- A 24-year-old woman with FCD after mTBI / concussion in post-graduate school after a "clash of heads" during a club soccer game who has taken a semester off and quit her part-time job

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### Overview: FCD Diagnosis, Mechanisms & Treatment

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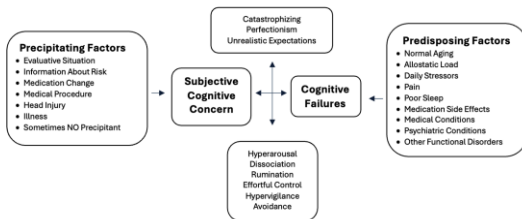
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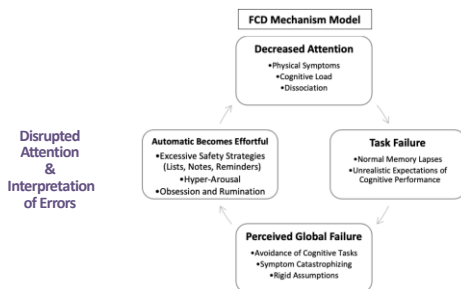
### FCD Mechanism: Adapted From Silverberg & Rush, 2023



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### FCD Mechanism

Attention & Interpretation of Errors

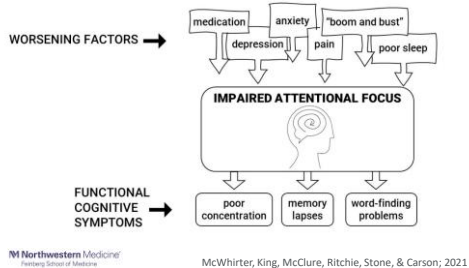
- At the core of FCD is believed to be **disruptions in attention**. This disrupted attention leads to **task failures or decreased task efficiency**.
- Catastrophic interpretations leads to **alarm in cognitive situations**, and **predictions of future cognitive failures**.
- Typically **automatic** cognitive tasks become **excessively effortful and alarming** which further disrupts attention, and onwards in a vicious cycle.

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### FCD Mechanisms: Impaired Attention



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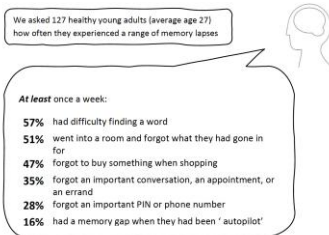
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### FCD Mechanisms: Misinterpretation of Errors



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McWhirter, King, McClure, Ritchie, Stone, & Carson; 2021

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### Overview: FCD Diagnosis, Mechanisms & Treatment

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## FCD & Neurodegenerative Disease Differential

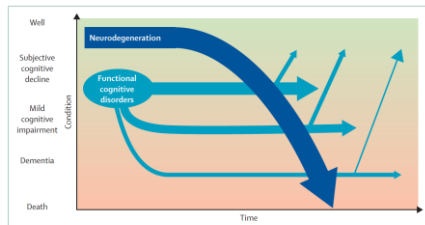


Figure 4: Degenerative brain disease and functional cognitive disorder trajectories

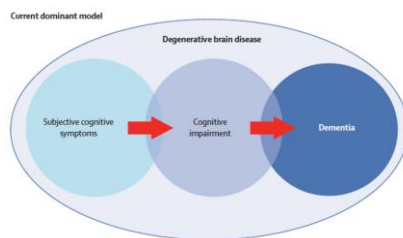
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McWhirter, King, McClure, Ritchie, Stone, & Carson; 2020

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## Cognition & Neurodegenerative Disease Models



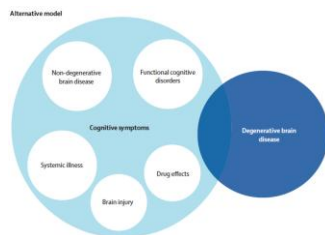
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## Cognition & Neurodegenerative Disease Models



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FCD & Neurodegenerative Disease Differential

Functional Cognitive Disorders	Degenerative Brain Disease
<ul style="list-style-type: none"><li>• <b>Attends alone</b></li><li>• Able to find clinic</li><li>• Independent detailed account of difficulties</li><li>• <b>Speaks for &gt;1 minute in response to opening questions</b></li><li>• Communicates clearly</li><li>• Recounts many examples of symptoms and lapses</li><li>• <b>At times, exact symptom date onset</b></li><li>• Describes variable encoding-based memory failures</li><li>• Increased frequency of inattentive normative lapses</li><li>• <b>Periods of totally normal cognitive functioning</b></li><li>• Complaints of specific memory "gaps"</li><li>• Blocks for overlearned material (PIN, passwords, birthday)</li><li>• <b>Unstable longitudinal course</b></li><li>• <b>Other less concerned</b> about cognitive symptoms or functioning, and may be more concerned about pain, anxiety, etc.</li></ul>	<ul style="list-style-type: none"><li>• Attends with someone</li><li>• Requires assistance</li><li>• Turns to others for answers</li><li>• <b>Absence of details</b></li><li>• Unlikely to give spontaneous details or answers</li><li>• <b>Less clear onset</b></li><li>• <b>Less aware / unaware of memory difficulties</b></li><li>• Dismisses or normalizes memory failures suggested by others "just my age", "could happen to anyone"</li><li>• More stable, or normative decline course</li><li>• Others more concerned about symptoms than the patient</li><li>• <b>May report forgetfulness, repetitive behaviors, social / emotional behaviors the patient is not aware of</b></li></ul>

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McWhirter, King, McClure, Ritchie, Stone, & Carson; 2020

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FCD & Neurodegenerative Disease Differential  
Cognitive Performance

Functional Cognitive Disorders	Degenerative Brain Disease
<ul style="list-style-type: none"><li>• May score in normal / high normal range</li><li>• May score below normal on face valid tests of memory especially if anxious, distressed, fearful</li><li>• <b>Signs of inconsistency across or within cognitive domain</b></li><li>• <b>Pattern inconsistent with typical neurologic profiles</b></li><li>• Evidence of continuous self-evaluation during testing "I'm not doing very well"</li><li>• May refuse to attempt questions</li><li>• Starts well, but then signs of "going blank" – usually associated with distress</li><li>• <b>Sudden fall-off in performance after a small errors</b></li></ul>	<ul style="list-style-type: none"><li>• Scores reliably below normal on cognitive testing</li><li>• <b>Pattern consistent with neurodegenerative disease</b></li><li>• Pattern consistent with neuropsychological domain expectations</li><li>• Less aware of performance</li><li>• Less distressed by performance or errors</li><li>• <b>More normative cognitive fatigue pattern</b></li></ul>

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McWhirter, King, McClure, Ritchie, Stone, & Carson; 2020

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Functional Cognitive Disorder: Diagnostic Criteria

1. One or more symptoms of impaired cognitive function are present
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Ball, et al; 2020  
McWhirter, King, McClure, Ritchie, Stone, & Carson; 2020

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Functional Cognitive Disorders: Other Key Publications

**Noah Silverberg, PhD**  
Mild Traumatic Brain Injury & Persistent Symptoms After Concussion  
Neuropsychologists Role in FCD  
Performance Validity  
Memory Perfectionism  
Cogniphobia  
Perpetuating Factors

**David Perez, MD, PhD**  
A Case of Functional Cognitive Disorder: SLP & Psychotherapy

**Veronica Cabreira, MD**  
FCD Diagnosis Delphi Study & Preliminary Check List

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Overview: FCD Diagnosis, Mechanisms & Treatment

- Cognition in FND
- FCD Diagnostic Features
- FCD Proposed Mechanisms
- FCD vs Neurodegenerative Disease
- **FCD Treatment**

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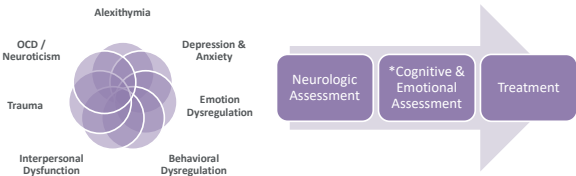
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Functional Cognitive Disorders  
Associated Emotional Features



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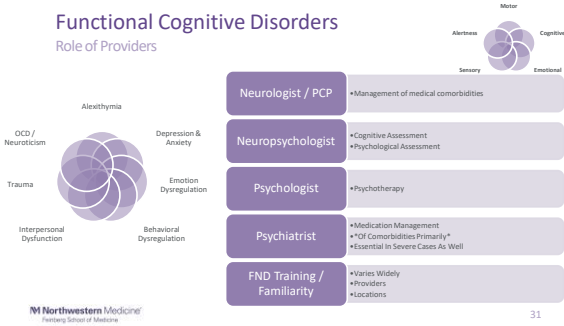
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Functional Cognitive Disorders

Role of Providers



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Functional Cognitive Disorder

Assessment & Treatment Planning Phase

Psychological Functioning Assessment During Initial FND Clinic Visit		
FND Associated Normative Acute	Long Standing & Stable Psychiatric Factors	Unstable Psychiatric Factors
Thoughts/ Outlook Behaviors Emotions Psychosocial Relationships	History Prior treatment Outcome of prior treatment Current status  Interaction with FND symptoms Implications for FND Treatment	Triggers  Current treatment  Status  Severity  Crisis Response Plan

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Functional Cognitive Disorder

Assessment & Treatment Planning Phase

Normative Emotional Response	Long Standing & Stable	Unstable & Severe
<ul style="list-style-type: none"><li>• "I've never been in psychotherapy or taken medications for my mood before"</li><li>• "Will these symptoms ever go away?"</li><li>• "I just want my old life back"</li><li>• "I'd be fine if I can just fix this"</li><li>• "I'm just bothered by these symptoms, otherwise my life is normal and I want to get back to it"</li></ul>	<ul style="list-style-type: none"><li>• "I have a history of anxiety and depression"</li><li>• "I've been on anxiety and depression medicine for a while- it helps"</li><li>• "I have been in therapy a few times when [stressful life event]"</li><li>• "These symptoms make my mood so much worse"</li><li>• "It's getting harder to manage"</li></ul>	<ul style="list-style-type: none"><li>• "I was abused my whole life"</li><li>• "I've been to several therapists, they don't help"</li><li>• "I've tried every mood medication, none help"</li><li>• "I don't know how many suicide attempts I've had...a bunch"</li><li>• "I can't do anything right now because everything is so bad"</li><li>• "I can't take anymore of this"</li></ul>

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Functional Cognitive Disorder  
Treatment Recommendations

Psychological Recommendations Following Exam	
FND Associated Aspects & Normative Acute	Emotional, behavioral, thoughts: if normative, proceed with FND treatment Explore any impact during FND Psychotherapy
Stable Long Standing	Optimize any current psychotherapy to incorporate FND associated aspects (consultation, psychoeducation, resources with current psychotherapy provider etc. ) Relational; note any potential problematic relational dynamics and potential impact on treatment; make recommendations as needed Psychosocial factors; address as needed with assistance of social work; note potential impact on treatment; delay if extenuating / atypical psychosocial circumstance
Unstable / Severe	Delay FND program until Psychiatric conditions can be stabilized Once Psychiatric care team is in place, and patient has achieved stability, proceed with FND treatment with caution, coordinate care extensively

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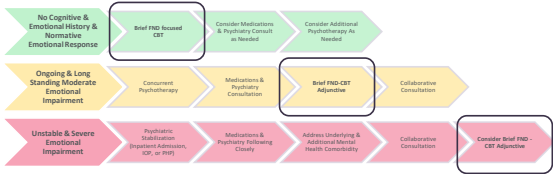
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Functional Neurologic Disorder Cognitive & Emotional Needs  
Care Implementation Timing



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Taking Control of Your Functional Cognitive Symptoms Workbook  
New FCD Specific Cognitive Behavioral Therapy Approach

Taking Control of Your  
Functional Cognitive Symptoms  
Workbook



Erin Cohen, PhD  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL 60637

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## Taking Control of Your Functional Cognitive Symptoms Workbook New FCD Specific Cognitive Behavioral Therapy Approach

Hypothesized Model Driven Targets	Multi-Modal Neurobehavioral Intervention Approach
<ul style="list-style-type: none"> <li>Individual FCD Process Education &amp; Model</li> <li>Identifying Contributors to Decreased Attention</li> <li>Emotional Awareness &amp; Regulation</li> <li>Develop Realistic Cognitive Expectations &amp; Approach</li> <li>Reinterpretation of Task &amp; Perceived Global Failure</li> <li>Reduce Over-Effortful Cognitive Processing</li> <li>Increase Behavioral Activation</li> <li>Increase Agency &amp; Self-Efficacy</li> </ul>	<ul style="list-style-type: none"> <li>Psychoeducation &amp; Motivational Interviewing</li> <li>Mindfulness Strategies</li> <li>Dialectical Behavioral Therapy</li> <li>Acceptance &amp; Commitment Therapy</li> <li>Attention &amp; Executive Functioning Skills</li> <li>Practical Problem Solving</li> <li>Behavioral Activation</li> <li>Self-Efficacy, Agency, &amp; Narrative Therapy</li> </ul>

**Other Content Highlights:** FCD Symptom Awareness Log, Symptom Trigger Charts, Thought Records, DBT Worksheets, Mindfulness & Relaxation Scripts, Weekly Goals, Weekly Consideration of Obstacles, Veteran-inclusive content (Veterans vignettes, Veteran examples such as explosion related mTBI on active duty)



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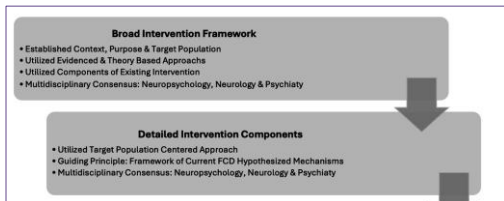
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## Taking Control of Your Functional Cognitive Symptoms Workbook: GUIDED Development



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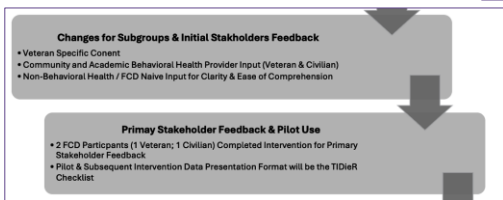
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## Taking Control of Your Functional Cognitive Symptoms Workbook: GUIDED Development



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## Taking Control of Your Functional Cognitive Symptoms Workbook: GUIDED Development



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## Taking Control of Your Functional Cognitive Symptoms Workbook: GUIDED Development



**Findings** We have created a comprehensive 14-chapter, manualized, therapist-guided neurobehavioral therapy protocol to target FCD symptoms independent of etiology – the Taking Control of Your Functional Cognitive Symptoms Workbook. Initial feasibility, tolerability, and utility were completed with 2 target population stakeholders with FCD (one civilian, one Veteran; both PGIC rating = 1 “Very Much Improved”). The Template for Intervention Description and Replication (TIDieR) checklist is provided as a supplemental table.

**Interpretation** This new promising multi-modality behavioral health intervention can be considered Stage 1 (i.e. intervention generation, refinement, modification, adaptation, and pilot testing). Further pilot testing is being conducted and will need to be followed by traditional efficacy testing (Stage 2).



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## Functional Neurological Disorder Society

- Improve the diagnosis and treatment of patients with functional neurological disorders;
- Operate exclusively for scientific, scholarly and educational purposes;
- Encourage and advance scientific research pertaining to functional neurological disorders;
- Provide forums, including International Congresses, online educational portals, medical journals and scientific symposia, open to a multidisciplinary audience;
- Increase awareness among healthcare professionals and the public about functional neurological disorders;
- Share ideas and to advance the related clinical and scientific disciplines;
- Encourage interest and participation in the activities of the Society among healthcare professionals and scientists;
- Collaborate with other related professional, patient-led, and other lay organizations.



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