NEUROLOGY + EVIDENCE SYNTHESIS

When Is a "Functional" Neurological Symptom Actually Functional?

Diagnostic Reasoning in FND

Positive signs, diagnostic confidence,
and the risk of misdiagnosis

DIAGNOSTIC CONTROVERSY BRIEF

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Selected Works | Project 3

Clinical question and evidence approach

In adults with weakness, tremor, or seizure-like episodes, when do positive findings justify a diagnosis of functional neurological disorder (FND), and what safeguards reduce diagnostic error?

Clinical position

A defensible diagnosis links the presenting symptom to reproducible positive findings, considers competing explanations, and states what remains uncertain. Normal investigations or psychiatric history alone do not provide that link. FND can coexist with another neurological disorder; the task is to explain each clinically important symptom rather than assign every symptom to one label. [1-4]

Scope and audience

This brief is written for clinicians assessing adults. It focuses on functional leg weakness, functional tremor, and functional seizures. Pediatric presentations, treatment effectiveness, and other FND phenotypes are outside its detailed scope. The final page is an educational decision aid, not a validated prediction rule.

Evidence approach

A targeted literature search through September 2026 identified primary diagnostic studies, longitudinal cohorts, and professional consensus or guidance. Sources were drawn from PubMed-indexed literature and guidance from the American Academy of Neurology (AAN) and International League Against Epilepsy (ILAE). Selection prioritized evidence directly addressing diagnostic performance, coexistence, diagnostic revision, or clinical communication.

Search focus	Representative terms
Motor signs	Hoover sign suspected stroke; Sonoo abductor sign; functional tremor validation
Diagnostic error	neurology follow-up diagnostic revision; FND misdiagnosis; coexistence
Seizures and care	AAN functional seizures guideline; ILAE staged diagnosis; video-EEG; coexisting epilepsy

Appraisal considered sample size, recruitment setting, blinding, reference standard, precision, and clinical applicability. Key numerical claims were cross-checked against source records. This was a targeted narrative review rather than a systematic review; no pooled analysis, formal GRADE assessment, duplicate extraction, or comprehensive risk-of-bias tool was applied.

> **Interpretive recommendations and the decision aid synthesize the cited evidence and have not been prospectively validated.**

Evidence on positive motor signs

Hoover sign

The relevant finding is weak voluntary hip extension with improved involuntary extension during resisted flexion of the opposite hip. Document the change actually observed rather than simply recording "inconsistent effort." In a prospective, unblinded suspected-stroke cohort, 124 of 337 participants had leg weakness and eight had functional weakness. Sensitivity was 63% (95% CI 24-91) and specificity 100% (95% CI 97-100). [5]

Appraisal: The small number of functional cases produces wide uncertainty around sensitivity. Unblinded assessment raises concern about independence of the sign and reference diagnosis. Observed perfect specificity in this cohort is not a guarantee across settings; a negative Hoover sign cannot exclude functional weakness. A reported false-positive Hoover sign in apraxia is a concrete warning against interpreting the maneuver in isolation. [5,6]

Hip abductor sign

The hip abductor sign compares voluntary hip abduction with the associated contralateral movement elicited during resisted abduction. Sonoo studied 33 patients with unilateral leg paresis: 16 were classified as functional and 17 had other causes. The sign correctly classified all participants in this small development study. [7]

Appraisal: The sample was small and selected, so the result does not establish performance in an unselected acute-care population. Pain, difficulty understanding instructions, marked bilateral impairment, or an otherwise uninterpretable motor examination should reduce confidence.

Distractibility and entrainment

Distractibility is a reproducible change in tremor during another task. Entrainment is a shift toward the frequency of a voluntary rhythmic movement, commonly contralateral tapping. In a prospective electrophysiological validation study of 38 functional-tremor cases and 73 other tremor cases, blinded raters applied a prespecified test battery. The composite threshold yielded 89.5% sensitivity and 95.9% specificity. [8]

Appraisal: These estimates apply to the complete laboratory battery, not a single bedside distraction or tapping maneuver. Specialized recording conditions and selected groups limit transfer to general practice. Use converging findings and seek movement-disorders or neurophysiology assessment when the phenotype remains uncertain. [8]

What the evidence permits

A positive sign supports a functional mechanism for the examined symptom. It does not establish why the symptom developed, prove conscious control, exclude a second disease, or validate unrelated symptoms. Agreement between several findings can strengthen a clinical formulation, but this brief supplies no numerical score or minimum sign count. [1,2,5-8]

Functional seizures and the risk of misdiagnosis

Functional seizures require phenotype-specific evidence

A motor sign does not classify seizure-like episodes. Obtain descriptions of every event type, witness accounts, and available recordings. The ILAE staged framework distinguishes possible, probable, clinically established, and documented diagnoses according to the available history, witnessed semiology, and EEG evidence. It accommodates limited access to video-EEG without treating all certainty levels as equivalent. [3]

The 2026 AAN guideline recommends obtaining historical and semiological information from patients and witnesses, including smartphone videos when available, and may use video-EEG capture of typical events where feasible. Clinicians should assess for coexisting epilepsy. A normal interictal EEG alone is insufficient, and the absence of a scalp EEG correlate does not automatically establish a functional seizure. [4]

Coexistence is clinically consequential

In a retrospective epilepsy-monitoring-unit study, 19 of 59 patients with functional seizures also had epilepsy. This selected referral population cannot provide a general-population prevalence estimate. Its practical lesson is narrower: one documented functional event should not be assumed to explain every attack. Distinct event types may require distinct diagnoses and treatment plans. [9]

Low diagnostic revision does not mean zero risk

A Scottish prospective cohort followed patients whose symptoms were initially rated as insufficiently explained by disease. Among 1,030 patients with follow-up, four (0.4%) acquired an unexpected disease diagnosis that plausibly explained the original symptoms over 18 months. The original cohort was heterogeneous and was not restricted to patients with positively diagnosed FND. [10]

Appraisal: Primary-care follow-up, incomplete follow-up from the original 1,144 patients, and the limited observation period constrain interpretation. The result is reassuring for that setting but cannot define a universal FND misdiagnosis rate or justify abandoning reassessment. [10]

Diagnostic error also occurs in the opposite direction. In a separate prospective cohort of 2,378 patients whose symptoms were initially judged largely or completely explained by neurological disease, 10 (0.4%) later received a functional diagnosis that better explained the original presentation. The objective is accurate attribution, not maximal testing or maximal diagnostic skepticism. [11]

Implication for diagnostic confidence

Record the diagnosis at the level supported by the evidence. Separate the positive finding, its interpretation, and the overall diagnostic conclusion. Explicit uncertainty is preferable to an unsupported definitive label; continued investigation should address a specific competing hypothesis.

Diagnostic framework and cognitive errors

Build a symptom-specific formulation

First establish onset, trajectory, distribution, functional impact, and the relevant neurological examination. Acute or progressive findings that raise concern for another urgent condition require their usual assessment. A previous FND diagnosis should not determine the interpretation of a new presentation.

Next, reproduce the positive finding with clear instructions and document both the voluntary task and the comparison condition. Decide whether the sign explains the target symptom, whether confounding limits its interpretation, and whether another diagnosis remains plausible. Use investigations to resolve those questions. This framework is a clinical synthesis, not an independently validated algorithm. [1,3-8]

Cognitive error	Typical faulty inference	Corrective action
Premature closure	"The scan is normal, so this is FND."	Identify the positive clinical evidence and the limitations of the test.
Psychiatric attribution	"Anxiety explains the weakness."	Assess anxiety separately; require neurological evidence for FND.
Overconfidence in a sign	"Positive Hoover means no other disease."	Review technique, confounding, and the remainder of the examination.
Diagnostic overshadowing	"All new attacks are functional."	Characterize new or distinct events and reconsider coexistence.
Testing without an endpoint	"More normal tests will eventually prove FND."	State the competing hypothesis and how the result would alter care.
Attributing intent	"Distractibility means deliberate symptoms."	Describe the finding without inferring deception or conscious control.

Document confidence without false precision

A concise structure can separate evidence from interpretation: *"The finding supporting functional [symptom] is [specific observation]. It is reproducible under [conditions]. Interpretation is limited by [confounder, if any]. The main competing or coexisting condition is [condition], addressed by [assessment]. The plan is [follow-up and reassessment triggers]."*

These categories are illustrative clinical-reasoning pitfalls informed by the cited evidence; they are not validated risk factors or frequency estimates. [1-11]

Practical implications and conclusion

Communicate the observed evidence

Explain the positive finding in ordinary language and relate it directly to the patient's symptom. Validate the impairment and avoid implying fabrication. The presence or absence of an obvious psychological stressor does not determine the diagnosis. Clear explanation and multidisciplinary care are central to contemporary FND management. [1,2]

Example language

"Your leg produced more strength during the other movement than during the direct test. That change is a positive finding and helps explain why I think this weakness is functional. The difficulty is real. We can discuss treatment aimed at improving movement, while also reviewing any other findings that need separate attention."

Adapt the explanation to the findings and the patient's understanding. Avoid implying that one sign proves the entire nervous system is normal or promising a particular outcome.

Coordinate care around the formulation

Neurology should clarify the neurological evidence and unresolved differential. Mental-health clinicians can assess relevant comorbidity and contribute to treatment without serving as a test of whether symptoms are "real." Rehabilitation clinicians contribute symptom-focused functional goals. Assign follow-up responsibility explicitly rather than leaving the patient between specialties. [1,2,4]

For established functional seizures, the AAN recommends against benzodiazepines or antiseizure medications solely for functional seizures when there is no coexisting epilepsy or other indication, and recommends tapering antiseizure medications when no other indication remains. Medication changes require review of coexisting epilepsy and other indications; an undifferentiated acute event still warrants appropriate emergency assessment. [4]

Reassessment is part of the plan

Specify which developments warrant renewed assessment, such as a new persistent focal deficit, progressive objective signs, a materially different event pattern, or systemic features suggesting another process. Reassessment should be proportionate to the change in presentation and should revisit the original evidence rather than automatically discard it.

Conclusion

FND is most defensibly diagnosed when the clinician can explain what positively supports the diagnosis and what the evidence does not settle. Motor signs provide useful information, but small studies, setting effects, and test limitations constrain certainty. Seizure-like events require phenotype-specific assessment, and neurological comorbidity remains possible. A clear explanation, a documented differential, and an explicit follow-up plan turn diagnostic confidence into accountable clinical care. [1-11]

References

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One-page clinician decision aid

Adults with possible functional weakness, tremor, or seizure-like events

> **Educational synthesis of references 1-11. This pathway is not a validated diagnostic rule or an emergency-treatment protocol.**

1 Identify urgent competing explanations

New acute deficit, physiological instability, persistent altered consciousness, or rapidly progressive objective signs? If yes, prioritize the relevant emergency assessment. Positive functional findings may coexist and do not cancel that pathway.

2 Select the presenting phenotype

Weakness or tremor	Seizure-like events
Examine the neurological pattern. Elicit a relevant sign: Hoover or hip abductor for leg weakness; reproducible distractibility or entrainment for tremor.	Describe every event type using the patient, witnesses, and recordings. Consider epilepsy, syncope, and other physiological causes.
Check instructions, pain, and other limitations. Record the specific comparison demonstrating the sign.	Use specialist assessment and video-EEG where feasible. Classify the event actually assessed; a normal interictal EEG is not diagnostic.

3 Decide whether the evidence is sufficient

Concordant positive findings with no better explanation for the target symptom -> explain the supported functional diagnosis. Evidence incomplete, confounded, or discordant -> document uncertainty, arrange targeted assessment, and avoid a definitive label.

4 Check for coexistence

Does another finding or event type require its own diagnosis? If yes, investigate and manage both. Do not extrapolate a functional diagnosis from one symptom to all symptoms.

5 Explain and agree a plan

Name the condition, demonstrate the relevant evidence when appropriate, and validate the impairment. Agree symptom-specific care, coordinate neurology with rehabilitation and mental-health services as indicated, and assign follow-up responsibility.

6 Define reassessment triggers

New objective findings, progression, or a different event pattern -> reassess the differential. At follow-up, review understanding, function, remaining uncertainty, and whether the care plan was implemented.

Record before closing: positive evidence | examination limitations | competing/coexisting diagnoses | confidence | action | follow-up.