

# Functional Neurologic Disorder (FND)

Nathaniel Yomogida

Chloë Kerstein

## Related readings

- HYSTERIA<sup>1</sup>
- BRIQUET DISEASE<sup>1</sup>
- SOMATIZATION DISORDER<sup>1</sup>
- PSYCHOGENIC NEUROLOGIC DISORDER<sup>1</sup>

## History of FND

### Conversion Disorder

These disorders were traditionally termed “Conversion disorder” by Freud and his followers to describe the conversion of “psychic energy” into physical symptoms<sup>1</sup>

### Psychogenic Neurologic Disorder

2 types of clinical psychogenic neurologic disorders:

## Note

Both of these disorders are considered to have no physical explanation of symptoms<sup>1</sup>

## Compensation Neurosis

### Chronic illness + Classical Hysteria

- A chronic illness marked by multiple and often dramatically presented symptoms and somatic abnormalities of “classic hysteria,”
- Predominantly in women (there is potential sexism and acquisition bias in this categorization but we report our and our colleagues contemporary experience) and

- Inexplicable disability or symptomology
- Individual is obtaining compensation, influencing litigation, avoiding military duty or imprisonment, or for the manipulation of some other interpersonal or societal situation.
  - This latter state has been called compensation neurosis, compensation hysteria, or hysteria with sociopathy, in other words, malingering.
- Predominantly of men but also of women who

## Pathophysiology Framework of FND

### **i** Note

Through studies, it has been shown that functioning of brain is different than feigning<sup>2</sup>.

FND has been described as dysfunction across brain circuits<sup>3</sup>. Of these brain circuits, 5 constructs have been created<sup>3</sup>.

1. [Emotion processing \(Salience\)](#)
2. [Agency](#)
3. [Attention](#)
4. [Interoception](#)
5. [Predictive processing/inference](#)

### Emotion processing (salience)

Dysfunction in the emotional processing construct manifests as emotional reactivity, deficits in emotional awareness (ie physiological arousal in absence of emotional arousal), amplification of FND symptoms in some mood states (ie panic, shame), aberrant salience processing, etc<sup>3</sup>.

## Agency

Dysfunction in Agency manifests as impairment in belief/circuit around: Pt is agent of action/Free will → produces voluntary movement<sup>3</sup>. Movement lacking self agency is experienced as involuntary<sup>3</sup>. These involuntary movements are clinically deemed functional tremors or functional seizures, but the brain areas generating these movements are the same ones involved in the production of voluntary movements<sup>3</sup>.

## Attention

Attentional perseveration is defined as the “tendency to focus on a physiological system to the neglect of other systems, and an impaired ability to adaptively, volitionally shift attention<sup>3</sup>.” This concept is analogous to hemineglect syndrome where patients *can* attend to his/her unaffected body parts but this focus is considerably difficult and requires conscious effort<sup>3</sup>. Likewise, patients w/ Allocate attentional resources to threat stimuli (ie angry faces) (especially those with functional seizures)

## Interoception

*Interoception* refers to a process by which the nervous system senses/interprets/integrates internal body signals into conscious and unconscious perceptions of sensation<sup>3</sup>. In FND, the perception produced through interoception can be abnormally enhanced or diminished<sup>3</sup>. Abnormal interoception sensations can materialize as attenuated visual, auditory, or skin sensitivity<sup>3</sup>. Abnormal interoception can impact movements and result in tremors, dystonia, seizures, and weakness<sup>3</sup>.

## Predictive processing/inference

*Predictive processing/inference* refers to the process by which a person generates beliefs about cause/effects of events within/outside body<sup>3</sup>. Environmental conditions can rapidly alter this process<sup>3</sup>. FND patients with this dysfunction can demonstrate erroneous perceptual inference (about sensorimotor or emotionally valenced phenomena), and their beliefs become reality<sup>3</sup>.

**i** items that need to be cleaned up and added to the paragraph

Deficits in decision making and sensory processing<sup>3</sup>. Prior history dominates ongoing perspectives<sup>3</sup>.

## Examples

- Someone who expects weather to be cold will wear a winter jacket even on a sunny day in summer<sup>3</sup>.
- Functional leg weakness → pt does not sense that limb IS there, opposite of phantom limb syndrome<sup>3</sup>.

## Abnormal sensory input

updated by sensory input that indicates it IS there

## Subjective

### History

#### **i** Note

Due to the importance of MOI and risk factors, the subjective should Focus on predisposing, precipitating and perpetuating factors!<sup>2</sup>

- Adverse experience in childhood/recently? (very common)
  - Attachment theory (life growing up)
- Consider: Social/cultural norms, life experiences, religion, language, stress
- Psychological comorbidities
- Comorbidities

### Other medical evaluation

- Beliefs about the medical system
- Low rate of misdiagnosis → did a doctor diagnose?<sup>2</sup>
  - IBS? Chronic pain syndromes? CRPS?<sup>2</sup>
- Imaging

## Mechanism of onset

- What did you notice when it first started (emotions? Events? Drug side effects? Dissociation? infection?)<sup>2</sup>
- What are your triggers now? (if any)<sup>2</sup>

## Functional limb Weakness

- Functional limb weakness
  - Does it feel like the body does not belong to them?<sup>2</sup>
  - Any sensory disturbances associated with it?<sup>2</sup>
  - Collapsing weakness?<sup>2</sup>
  - Any falls?
- Expect: voluntary movements are hard while automatic ones are preserved. Also expect that there is a global pattern- affects flexors/extensors equally<sup>2</sup>

## Involuntary movements

- Functional tremor?
  - aggs/eases?
- Functional seizure:<sup>2</sup>
  - any urinary incontinence/physical injury? Seizure plan?
  - Any precursors like autonomic arousal? → note:

### **i** Note

functional seizures can be seen as an involuntary, learned brain “reflex” that gets rid of unpleasant sensations. Can explain to patients this way.

### **i** Note

Side note: No medications (seizure meds) should be used as it can exacerbate events → as much as 40% of pts with functional seizures can improve with meds (however, likely placebo effect)<sup>2</sup>

## Functional dystonia

- Presence
- Aggravating factors
- Easing factors

## Urinary retention/score negative cauda equina

- CBT usual tx<sup>2</sup>

## Functional cognitive symptoms

- Memory problems?<sup>2</sup>

### **i** Note

Memory problems in FND are likely d/t attentional deficits (lapses in concentration)<sup>2</sup>

- Metacognitive error is prominent in the form of catastrophic negative self evaluation of one's own cognitive performance (up to 24% of pts attending memory clinics may have functional cognitive disorder)<sup>2</sup>
- Examination of behavior and language during consultation discriminates functional from degenerative cognitive symptoms – those with functional cognitive disorder are likely to attend meetings alone, be distressed, give rich/specific accounts of memory failures compared to those with neurodegenerative disease<sup>2</sup>
- CBT helpful, contextualizing memory lapses that fall within normal, tackle unhelpful avoidance, and excessive/counterproductive use of memory aids/strategies (think post its etc). Also treat comorbid anxiety/depression as common<sup>2</sup>.

## Other symptoms

- Fatigue? Sleep disturbance? Concentration symptoms?<sup>2</sup>
- Speech problems (dysarthria, mutism, foreign accent syndrome), sensory problems (numbness/positive sensory symptoms, especially with motor symptoms) , hearing loss/sensitivity, visual loss/diplopia, globus, PPPD (chronic dizziness)<sup>2</sup>

### **i** APTA Recommendations

Per APTA may be beneficial to ask:

- Does the disorder produce more attention from a spouse?

- Does the disorder mean that the patient does not have to return to a job that she/he did not like?
- Is the amount of money received with disability insurance more, or more secure, than what the patient might get by working?
- Does the patient know how to get a job or what job she/he has sufficient expertise to do?

#### ⚠ APTA's red flags

Per APTA- Red Flags suggesting FMD

- Adult age of onset
- Paroxysmal tremor as predominant clinical feature
- High phenomenological variability between episodes
- Rapid and maximal severity
- Precipitation of attack or increase in symptom severity during examination
- Atypical and variable duration of attacks
- Presence of multiple atypical triggers
- Altered level of responsiveness
- Presence of odd precipitating factors
- Presence of unusual relieving maneuvers
- Additional functional physical signs or medically unexplained somatic symptoms
- Atypical response to medication
- Presence of somatization

## Objective

### Functional limb weakness

#### i Note

Note/Pt edu: Functional leg weakness → pt does not sense that limb IS there, opposite of phantom limb syndrome. Abnormal brain prediction that leg is not there, which overrides/fails to be updated by sensory input that indicates it IS there<sup>2</sup>

### Hoover's sign

A clinician can check for [Hoover's sign](#) in order to differentiate between general hip extension weakness and *functional* hip extension weakness.

Technique (assuming the L hip is demonstrating weakness):

- Patient goes into hip extension against resistance with L leg
- Test patient's ability to perform resisted hip flexion on the *right* leg which indirectly tests hip extension on the left leg.
- If the patient has L hip extension weakness against direct resistance, but has sufficient strength against resistance with R hip flexion, this is considered positive

[Read more about Hoover's Sign](#)

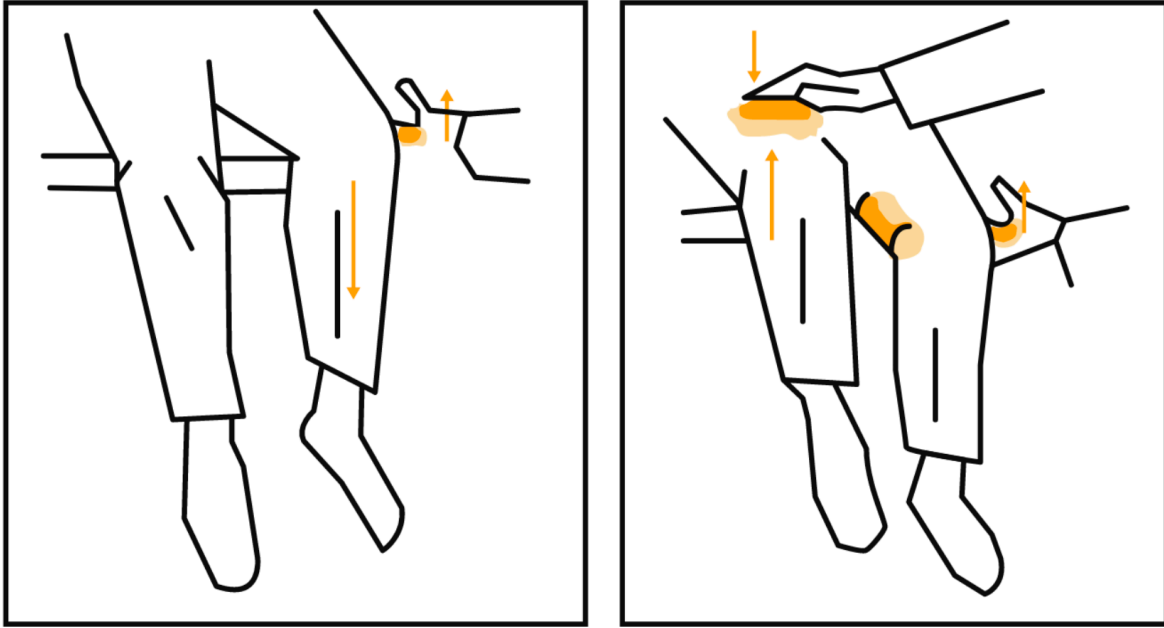


Figure 1: Hoover's sign<sup>2</sup>.

### Hip Abductor Sign

Weakness of hip abduction that returns to normal with contralateral hip abduction against resistance



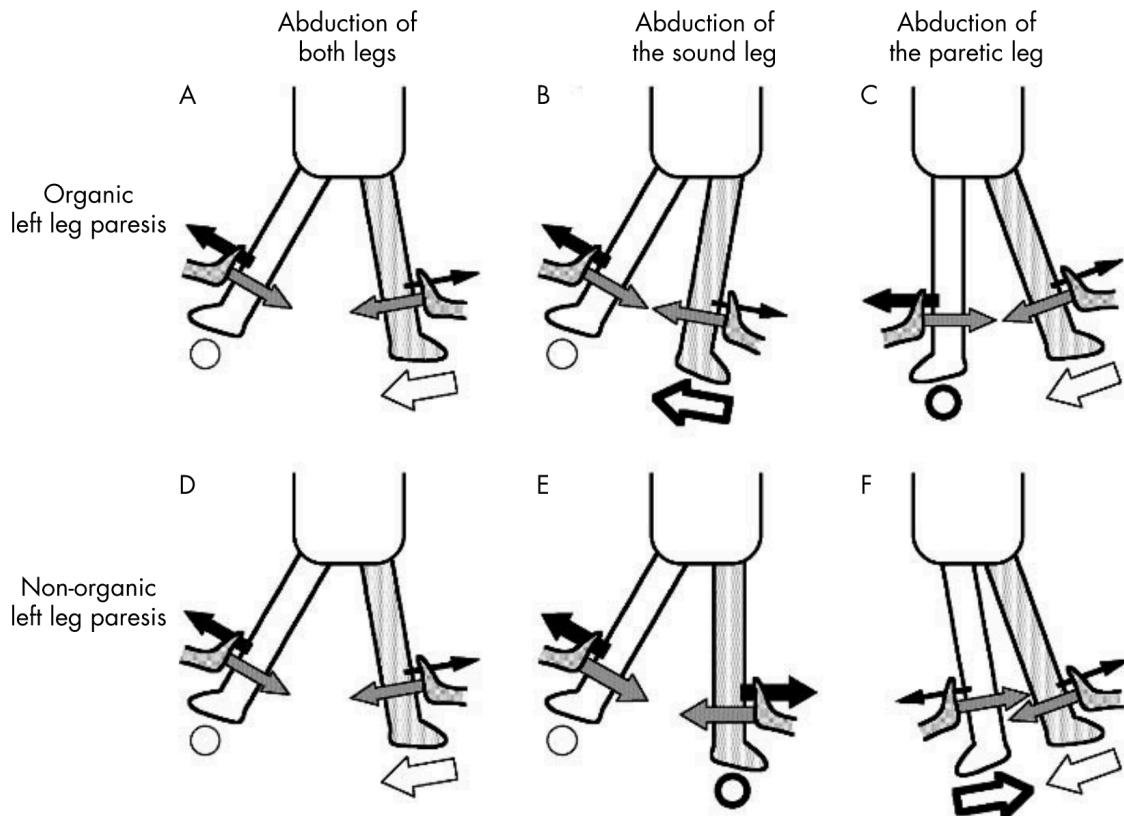


Figure 2: Hip Abductor sign<sup>4</sup>.

## Arm Drop Test

### APTA?

In the arm drop test, the patient is placed in the supine position. The examiner ensures that the patient's face is shielded (in case of an organic etiology) and lifts the patient's plegic arm, suspending it over the patient's face, then abruptly allowing the arm to fall. The patient will deflect the arm from hitting the face in the case of FMD.<sup>79</sup>

## Functional Tremor

In the arms, ask the patient to copy a rhythmical movement made between finger/thumb using their better hand<sup>2</sup>. In the legs, ask the patient to copy foot tapping<sup>2</sup>. And in the neck, have the patient follow movements of your hand with their tongue<sup>2</sup>.

In a functional tremor, one should expect to see variable frequency (not amp) tremor that changes dramatically during externally cued rhythmic movements<sup>2</sup>. If the tremor on the other hand stops, entrains to the same rhythm, or pt has difficulty copying movement → consider functional tremor<sup>2</sup>.

#### Other distraction maneuvers via APTA

- Finger tapping movements at different speeds
- Side-to-side tongue movements
- Counting-serial 7 backward
- Contralateral rhythmic ballistic movements

#### **i** Note

While a functional tremor will entrain with distraction, an organic tremor will typically increase in amplitude with distraction. Entrainment can result in remission in FMD during distraction maneuvers with uninvolved limbs

#### Other presentations of functional tremors

Item	Phenotype
Optional Features	
Ballistic suppression	Brief arrest of tremor with performance of a ballistic movement
Dual task interference	Disruption in tremor frequency and amplitude when simultaneous tasks are performed
Increase amplitude with weight loading	Tremor amplitude increases with increasing weight applied to the limb
"Whack-a-mole" sign	Spread of tremor to another body part when restrained by the other hand
Other functional signs or phenotypes	Give-away weakness, non-dermatomal hypoesthesia, associated signs
Universal features	
Frequency variability	Tremor frequency changes throughout examination
Entrainment or full suppressability	Tremor either disappears (suppressability) or adopts the frequency of the external rhythm (entrainment)
Distractibility	Tremor amplitude attenuates when attention is driven away from the limb
Tonic coactivation	Co-contraction of antagonistic muscles immediately prior to movement

Source: @schwingenschuhFunctionalTremor2022

#### **i** Note

Many movement disorders worsen with stress/disappear with sleep → do not rely on these sx for a diagnosis

## Functional Dystonia

Functional dystonia can present as fixed abnormal posture, but other forms are usually mobile<sup>2</sup>

Can present as:

- Inverted/PF ankle
- Flexion of fingers
- Face dystonia (jaw deviation to one side + contraction of platysma + lip curl down/upward + facial weakness + contraction of orbicularis oculi can be present + eyebrow lowered on affected side<sup>2</sup>)

Functional dystonia commonly results in secondary symptoms of pain which can severely impede with ADLs<sup>2</sup>

## Treatment Plan

## Patient Education

### Mechanism

### Symptoms

#### Note

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4. Sonoo M. [Abductor sign: A reliable new sign to detect unilateral non-organic paresis of the lower limb](#). *Journal of Neurology, Neurosurgery, and Psychiatry*. 2004;75(1):121-125.