

Eye-opening behaviors help diagnose nonepileptic seizures

New techniques supplement traditional methods

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On average, 7 years elapse between a patient's first psychological nonepileptic seizure (PNES) and the correct diagnosis.¹

PNES can be difficult to distinguish from epileptic seizures (ES), with both showing alterations in behavior, consciousness, sensation, and perception.² Delayed diagnosis could lead to:

- adverse effects from unneeded antiepileptic drugs
- iatrogenic complications from invasive procedures in continuous PNES
- medical costs due to unnecessary hospitalization treatment and workup
- delayed referral to appropriate psychiatric treatment
- employment difficulties and disability.

Fortunately, researchers are discovering some clinically useful differentiating features to use as adjuncts to video EEG, the diagnostic gold standard.^{3,4}

BEHAVIORAL DIFFERENCES

Differentiating PNES from ES (*Table 1, page 122*) is the first step toward appropriate treatment,⁵ and observing seizure characteristics can be helpful.

Eyes open or closed? Using data from video-EEG monitoring, researchers found that:

- 50 of 52 PNES patients (96%) closed their eyes during the seizure
- 152 of 156 of ES patients (97%) had their eyes open at the beginning of their seizures.⁶

Observing a patient's eyes during a violent seizure could be difficult, but this information might help clinicians differentiate between PNES and ES, particularly when the two types of seizures occur in the same patient. Also, other observers, such as family members, could report to physicians if the patient's eyes were open or closed during the ictal event.

Patients with PNES may also exhibit geotropic eye movements, in which the eyes deviate downward to the side that the head is turned.⁷ Eyelids are typically closed for a longer duration (20 seconds) compared with temporal lobe epilepsy (TLE) or frontal lobe seizures (FLS) (~2 seconds).⁸ Weeping also is a characteristic with PNES.^{9,10} Ictal stuttering and post-ictal whispering are seen in PNES.^{11,12} Post-ictal nose rubbing and cough have been observed in TLE but not in PNES.¹³

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Table 1

Behaviors to distinguish psychological nonepileptic and epileptic seizures

Behavior	Psychological nonepileptic seizure	Epileptic seizure
Eye movement	Eyes closed at onset and during seizure; geotropic eye movement may be observed	Eyes open during seizure onset; may close briefly
Post-ictal nose rubbing and cough	Not present	May be present
Weeping	May be present	Not present
Body movements	Pelvic thrusting; out-of-phase or side-to-side oscillatory movements; chaotic and disorganized thrashing; ictal stuttering; post-ictal whispering	Pelvic thrusting; quick, tonic posturing; vocalization
Self-injury	May be present	May be present
Tongue laceration	May be present	May be present
Incontinence	May be present	May be present

Source: References 6-12, 16, 17

Pelvic thrusting reportedly is as common in FLS as in PNES. Other ictal features associated with PNES are out-of-phase or side-to-side oscillatory movements or chaotic and disorganized thrashing.² In contrast, FLS typically arise from sleep, are brief, and often involve vocalization and quick, tonic posturing.^{14,15} Occasionally, whole body trembling may be observed with PNES. These behaviors may wax, wane, and change over many minutes, which is atypical for ES.

Injury. Physical injury during an ictus was once thought to occur only in patients with epilepsy, but research shows more than one-half of patients with PNES are injured during seizures.¹⁶ Tongue biting, self-injury, and incontinence are commonly associated with ES but are also reported by

two-thirds of PNES patients, rendering these signs less specific than once thought.¹⁷

DIAGNOSTIC MEASURES

EEG. PNES diagnosis is most accurately established by registering EEG neurophysiologic testing with video. Video-EEG—where the patient’s seizure is observed visually with simultaneous EEG—allows data about neurobehavior to be coupled with EEG rhythms. The absence of expected ictal patterns during the behavioral event points to a PNES diagnosis. Rarely, EEG-negative epilepsy occurs, where a partial simple seizure, a FLS, or a TLS does not generate an ictal epileptic pattern. Without video-EEG, neurologists’ ability to differentiate ES from PNES by history alone has a specificity of 50%.¹⁸

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Table 2

Neuropsychological (NP) differences between PNES and ES

Feature	Differences
Cognitive ability	Patients with ES and PNES show no significant differences on tests of intelligence, learning, and memory but score lower than healthy control subjects ²⁶
Psychomotor skills	Patients with PNES show reduced motor speed and grip strength, compared with healthy controls ²⁷
Motivation	Patients with PNES score lower on motivational measures than ES patients, perhaps reflecting a lack of psychological resources necessary to persist with a challenging NP battery; frank malingering is thought to occur rarely in PNES ²⁸
Personality	Minnesota Multiphasic Personality Inventory (MMPI-2) studies show elevations in hypochondria, hysteria, and depression scores in patients with PNES ²⁹

Neuroimaging. Structural neuroimaging abnormalities neither confirm nor exclude ES or PNES. PNES may occur in the presence of focal lesions, as confirmed by:

- case reports of PNES patients who have CNS lesions¹⁹
- a study showing that 10% of patients with PNES alone have structural abnormalities on MRI.²⁰

A negative ictal single-photon emission computed tomography (SPECT) scan does not imply a diagnosis of PNES, nor does an abnormal scan mean that epilepsy is present. A small series of ictal and interictal SPECT scans of patients with PNES revealed a few scans with lateralized perfusion abnormalities, but the findings did not change when the ictal and interictal images were compared.²¹ Patients with epilepsy, in contrast, have dynamic changes when ictal and interictal changes on functional neuroimaging are compared.

Neurohumoral testing. Serum prolactin drawn within 30 minutes of ictus onset is helpful for dif-

ferentiating generalized tonic clonic seizures and partial complex seizures from PNES, as summarized in a recent report from the American Academy of Neurology.²²

PNES CHARACTERISTICS

Patient characteristics and neuropsychological testing are helpful adjuncts to video EEG to diagnose PNES.

Family and patient traits. Studies comparing family functioning in patients with ES and PNES reveal:

- individuals with PNES view their families as more dysfunctional, particularly in regard to communication²³
- family members of patients with PNES reported difficulties defining roles²³
- patients with PNES score higher on measures of somatic complaints when compared with other seizure patients.²⁴

Pain disorders are also common in patients with PNES. Among epilepsy clinic patients, a

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diagnosis of fibromyalgia or chronic pain has an 85% positive predictive value for PNES.²⁵

Neuropsychological measures. A number of studies describe the cognitive, emotional, personality, and psychomotor differences between ES and PNES cohorts (Table 2, page 124).²⁶⁻²⁹ Patients with ES and PNES perform about the same on neuropsychological measures but worse than healthy controls. Patients with PNES appear to suffer from cognitive and somatic distress and anxiety. Studies reveal they also have difficulties expressing this distress to family members and others.

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Psychological nonepileptic seizures (PNES) can be difficult to distinguish from epileptic seizures by history alone. Physical signs, patient characteristics, and neuropsychological testing are helpful adjuncts to video EEG to establish a PNES diagnosis.

BottomLine