

# *Eye Movement Desensitization and Reprocessing in the Psychological Treatment of Trauma-Based Psychogenic Non-Epileptic Seizures*

Susan D. M. Kelley<sup>1\*</sup> and Selim Benbadis<sup>2</sup>

<sup>1</sup>*Department of Rehabilitation and Mental Health, University of South Florida*

<sup>2</sup>*Comprehensive Epilepsy Program, Tampa General Hospital*

Little is known about the types of mental health treatment that are most effective for psychogenic non-epileptic seizure (PNES) patients who have high rates of comorbid post-traumatic stress disorder (PTSD) and dissociation. Eye movement desensitization and reprocessing (EMDR) has proved to be effective in the treatment of PTSD, anxiety states, dissociative symptoms and somatoform disorders. This study, which utilized a non-controlled qualitative multiple revelatory case design, integrates EMDR into the psychological treatment of PNES patients with confirmed trauma experiences. With EMDR targeting trauma and dissociative symptoms in three patients, PNES were extinguished in two. Those patients have remained seizure-free for 12–18 months. Copyright © 2007 John Wiley & Sons, Ltd.

## INTRODUCTION

Individuals with psychogenic non-epileptic seizures (PNES) experience episodes of abnormal movements or sensations that mimic true epileptic seizures, yet they have no abnormal electrical discharges in the brain. Because their 'seizures' are caused by unconscious psychological processes (Reuber & Elger, 2003), not brain dysfunction, they are refractory to anti-epileptic medications. PNES patients also have rates of psychiatric disorders that greatly exceed those of the general population, as measured by prevalence and past psychiatric hospitalizations (Kessler et al., 1994). Among the most common are post-traumatic stress disorder (PTSD), depression, somatoform (conversion disorder with seizures) and dissociative disorders. Despite these facts, little is known about the types of psychological treatments that are most effective for them (Reuber & House, 2002). Some authors

(Aboukasm et al., 1998; Bowman, 2001) advocate psychiatric treatment and emphasize that such a treatment (particular types are unspecified) either terminates or reduces PNES occurrence while others (Kanner et al., 1999; Walczak et al., 1995) contend that mental health intervention has little bearing on outcome.

As Benbadis (2005) observed, PNES, although common, pose a frustrating challenge in health management. He reports that at least 10% of all medical services and 9% of inpatient neurology admissions are provided for psychogenic symptoms (p. 9). Kanner, Palac, Lancman, Lambrakis, and Steinhardt (2001) have noted high costs associated with PNES in terms of (a) quality of life for patients; (b) health care systems trying to treat them appropriately; and (c) disability benefits. Therefore, an effective psychiatric and psychotherapeutic intervention is required to improve management and ameliorate these costs.

The purpose of this study was to observe, treat, then analyse the efficacy of eye movement desensitization and reprocessing (EMDR), an accelerated information-processing model and somatically effective therapy, in resolving PNES in patients

\*Correspondence to: Susan Kelley, Ph.D., Department of Rehabilitation and Mental Health, University of South Florida, CAS SOC107, Tampa, FL 33620, USA.  
E-mail: skelley@cas.usf.edu

with trauma histories. The strategy was to focus on the trauma, hoping that once that was resolved, the PNES would cease. If successful, the results would influence psychological treatment strategies for similar patients.

## REVIEW OF LITERATURE

The literature on treatment of PNES is evolving. A search of electronic databases including MEDLINE and PSYCHINFO using terms such as 'seizures', 'psychogenic', 'conversion', 'dissociation' and 'trauma' yielded 227 items, most of which dealt with diagnosis of PNES and the phenomenon of conversion. Very few explored treatment. A similar search for EMDR and other treatment types combined with trauma including various forms of abuse, conversion, or dissociation yielded 34 items; only two addressed EMDR in relation to seizures.

Bowman (2001) notes that 'striking similarities exist in the characteristics of PNES or conversion disorder subjects and dissociative disorder subjects such as high rates of trauma or sexual abuse histories, dissociative amnesia, and comorbid Axis 1 disorders' (p. 363). Bowman further states that conversion seizures are likely a somatic presentation of dissociation, a means for patients to release trauma-related affect and distress (p. 365). Indeed, Torem (1993) reported that PNES ceased permanently after trauma was addressed in alters of dissociative identity disorder patients. Fleisher et al. (2002) compared patients with epilepsy with patients with PNES and found that the latter exhibited significantly different trauma profiles. These authors suggested that 'interventions aimed at trauma issues may be beneficial for patients with pseudoseizures [sic]' (p. 662).

Szaflarski et al. (2003) reported that mood disorders and a history of 'adverse events' in life impacted health-related quality of life for 106 patients diagnosed with PNES. Galimberti et al. (2003) attempted to identify a psychological profile of patients with PNES and learned that these individuals had higher percentages of somatoform and cluster B personality disorders than patients with epileptic seizures. Reuber and Elger (2003) reviewed studies of the diagnoses, aetiology, treatment and prognosis of patients with PNES. They advocated the documentation of a typical seizure by video EEG as a means of avoiding iatrogenic harm and stated that 'failure to recognize the psychological cause of [PNES] detracts from addressing associated psychopathology and enhances secondary somatization processes' (p. 205). Van

Merode et al. (2004) reported significantly more comorbid psychopathological complaints and features, including dissociative experiences, anxiety and childhood trauma, in 40 patients with recent onset PNES diagnosed via a 'standardized neurological examination' (p. 1175). These authors recommended early detection and treatment for patients' complex disorders.

Rosenblum (2000) reviewed case studies and literature exploring links between a history of sexual abuse in childhood and subsequent development of PNES in women and concluded that PNES express their rage, fear and helplessness. His work was followed by that of Abubakr, Kablinger, and Caldito (2003), who analysed clinical features of 23 female patients with PNES and found that more than half of those who had motor manifestations had a history of sexual and physical abuse. Prigatano, Stonnington, and Fisher (2002) also found that sexual abuse in childhood and dissociative phenomena were common among PNES patients referred for group psychotherapy. The authors reported that each patient was in an unacceptable or intolerable adult situation for which she perceived no solution.

Harden (1997) notes that traumatic experiences such as a history of sexual or physical abuse may underlie both PNES and dissociative disorders; indeed, this author suggests that PNES may be a manifestation of dissociative disorder rather than conversion. Bowman and Markand (1996) studied the association between trauma and PNES in 45 adult patients diagnosed with PNES. These authors found that 84% reported a history of trauma—sexual abuse (67%), physical abuse (67%) and other traumas (73%)—and concluded that PNES patients closely resemble patients with dissociative disorders. Prueter, Schultz-Venrath, and Rimpau (2002) also found a higher incidence of dissociation among 60 PNES patients of an outpatient epilepsy clinic. They noted comorbid depression and anxiety as well.

Clinical phenomena observed in adult PNES patients include (a) unresponsiveness associated with uncoordinated and disorganized motor activity (Meierkord et al., 1991); (b) generalized trembling (Lancman, Brotherton, Asconape, & Penry, 1993); (c) motionless stares (Gullick, Spinks, & King, 1982; Wylie, Benbadis, & Kotagal, 2002); and (d) pseudoauras such as lightheadedness, strange tastes and headaches (Lancman et al., 1993). These phenomena are also observed in dissociative states in which there is isolation between affect and thought (Scaer, 2001).

Trauma may take forms other than abuse. Ramchandani and Schindler (1992, 1993) identified patients with PNES and dissociative symptoms with guilt-laden bereavement as a precursor. Each patient had experienced a recent traumatic loss of a beloved significant other. Likewise, family dysfunction, particularly conflict (Krawetz et al., 2001), disallowing expression of negative affect (Bowman & Markand, 1999; Griffith, Polles, & Griffith, 1998), and somatization in response to distress (Wood, McDaniel, Burchfiel, & Erba, 1998) can also unwittingly contribute to the development or maintenance of PNES.

The literature on the psychological treatment of PNES is limited not only in the number of studies but also in reliable evidence to support any particular therapy (Reuber & House, 2002). Reduction in seizure frequency and improved psychosocial functioning are reported outcomes for cognitive behavioural therapy (Goldstein, Deale, Mitchell-O'Malley, Toone, & Mellers, 2004) and group psychotherapy (Prigatano et al., 2002); complete recovery (Chemali & Meadows, 2004) versus reactivation of absence seizures (Schneider, Nabavi, & Heuft, 2005) are reported outcomes for EMDR. Clearly then, there is a need for further study of specific treatments, including EMDR, for PNES patients.

## METHOD

### *Participants*

Adult patients with refractory seizures who had been referred to a comprehensive, hospital-based epilepsy programme were evaluated using video EEG monitoring for 3–5 days. Family members reviewed videos to determine if the seizures recorded were the habitual type. Of those patients subsequently diagnosed with PNES, 14 who expressed an initial willingness to consider psychological treatment were referred for community-based psychotherapy. Of that number, six subsequently declined to participate before psychological treatment commenced. The remaining eight ranged in age from 27 to 55; all were Caucasian. There were an equal number of males and females and all had, at a minimum, a high-school education. In addition to PNES, all had comorbid mental health disorders including conversion disorder with seizures (eight), PTSD (six), a mood disorder (five) and/or an anxiety disorder other than PTSD (three). Four had comorbid chronic physical illnesses as well.

### *Design*

This 2-year study utilized a qualitative multiple revelatory case design in which the investigators had an opportunity to observe and analyse PNES in persons with trauma histories. Treatment was psychological in nature and comprised EMDR as well as cognitive-behavioural and supportive counselling techniques. Data were analysed qualitatively.

The validity of this study rests on thick description and extensive time spent in the investigation. From the standpoint of generalizability, limitations include the small sample size, lack of random assignment and no control group.

### *EMDR*

EMDR is an eight-phase client-paced exposure treatment that uses rapid eye movements or alternating hand taps or tones in a left-right-left sequence to ameliorate anxiety, fear, intrusive images, intense sadness, anger, dissociation and other symptoms associated with trauma experiences. The approach focuses on affective, cognitive and somatic perceptual components of trauma in order to 'expedite the accessing and processing of disturbing events and to desensitize stimuli that trigger present distress as a result of second-order conditioning and to facilitate resolution of memories (e.g., elicitation of insight, cognitive reorganization, adaptive affects, and physiologic responses' (Shapiro, 2002, p. 2). Effects of the EMDR therapy are measured using Wolpe's Subjective Units of Distress scale (SUDs), which goes from 0 (no distress) to 10 (extreme disturbance). Controlled research has demonstrated the efficacy of EMDR with PTSD (Maxfield & Hyer, 2002), and both the American Psychiatric Association (2004) and the International Society for Traumatic Stress Studies (Chemtoui, Van der Kolk, & Pitman, 2000) have released practice guidelines endorsing the use of EMDR in acute and chronic PTSD.

### *Protocol*

#### *Preparatory Sessions*

The first several sessions were similar for all participants. The first session was an evaluation session and included informed consent, discussion of confidentiality, clinical intake and baseline assessment measures. The last included the Traumatic Experience Report, the Hamilton Anxiety and Depression scales and the Steinberg Dissocia-

tion scale. Subsequent sessions utilized cognitive behavioural and supportive therapy techniques and included a discussion of reactions to trauma and an explanation of the ways in which patients' PNES might be expressions of distress/rage/fear and other emotions associated with their trauma experiences. A rationale for treating their trauma with EMDR was also covered. Reassessment after preparatory sessions revealed that seizures did not abate during this baseline period.

#### *Treatment with EMDR*

Active EMDR sessions followed the eight-phase protocol suggested by Shapiro (1995). After establishing an imagined safe place, patients were asked to visualize a picture that represented their respective traumas and associated emotions and physical sensations. They were asked what negative thoughts they had about themselves associated with the trauma and what alternative positive thought they would prefer to have and then to estimate its believability on the Validity of Cognition (VOC) scale (1 = not at all, 7 = absolutely true). A baseline SUDs rating was obtained. During the desensitization phase, patients expressed discomfort with repetitive eye movements, so alternating hand taps were used instead. Patients were asked to hold in mind the image, thought and physical sensations while the therapist tapped the backs of their hands. At the end of each set, patients were asked to state what had emerged. They were asked to focus on that while the therapist tapped again. After several sets, their SUDs level was checked; when it reached a much lower number (e.g., from 10 to 1 or 2), the therapist 'installed' the positive thought by repeating the hand taps. The VOC rating was checked to be sure it was high (e.g., 7). The remaining phases of the EMDR protocol (body scan, closure, reevaluation) were then completed. The number of EMDR sessions required to successfully desensitize participants to their respective traumas and extinguish the seizures varied from six to seven.

#### *Therapist Training*

One doctoral-level clinician served as therapist. She had more than 10 years of clinical experience with trauma patients, had completed Levels I and II of EMDR training, and is a licensed mental health services provider. Before beginning treatment with participants, the therapist completed an EMDR refresher training as well as a detailed

study of PNES including viewing video tapes and video EEG sessions.

## RESULTS

Table 1 presents relevant characteristics and treatment outcomes for eight participants included in the study; two of the participants were seen for consultation only. One patient ceased having seizures when his neurologist told him 'You don't have to do that anymore' (W. Tatum, telephone conversation, October 20, 2005). Although this outcome may seem surprising, cessation of PNES following an explanation of their nature has been reported in the published literature in neurology (Aboukasm et al., 1998; Ettinger, Devinsky, Weisbrot, Goyal, & Shashikumar, 1999; Reuber & House, 2002). Two patients discontinued counselling after only two and three sessions, respectively. Of the remaining four, three participated in EMDR, and two became seizure-free after six and seven EMDR sessions, respectively; they have remained seizure-free for more than 12–18 months. Both had experienced generalized convulsive PNES for years that were suspected to be an abreaction of childhood psychological and physical abuse. Two patients still experience PNES. Both have PTSD, one of adolescent onset and the other of adult onset following a motor vehicle accident. The latter patient refused EMDR. Of the eight original participants, only one had sought and received prior mental health treatment including psychotropic medications. None had participated in a neuropsychological evaluation prior to initiation of psychotherapy.

The following are detailed descriptions in case-study format for each of the participants. These cases are considered revelatory in that each serves a specific purpose in the overall study, i.e., each demonstrates psychopathological and psychosocial features identified in previous literature. At the outset, it was predicted that PNES with a trauma base could be eliminated or substantially improved by treating the trauma with EMDR. This proved to be true for two of three patients.

#### *Case Study 1*

This patient is a 40-year-old Caucasian male who is married, unemployed and receives public disability benefits. He has complex partial seizures diagnosed in childhood as well as adult onset PNES diagnosed via video EEG monitoring in

Table 1. Characteristics and treatment outcomes for participants with psychogenic non-epileptic seizures (PNES)

Case #	Bio-demographics	Neurological and comorbid medical diagnoses	Associated psychopathologies	Treatment outcomes
1	40-year-old Caucasian male, married, receives state disability benefits	Complex partial seizures in childhood, controlled; PNES, adult onset, duration 18 months	PTSD, borderline intellectual functioning	Consult only; PNES continue
2	40-year-old Caucasian female, married employed	PNES, adult onset, duration 5 years; SLE; uterine cancer	PTSD, major depression	PNES eliminated and PTSD resolved with EMDR (six sessions) depression managed with prescribed medication
3	55-year-old Caucasian male, married, employed	PNES, adult onset, duration 5 years	Major depression, Dissociative Disorder with depersonalization, (traumatic grief)	Discontinued treatment; PNES continue
4	29-year-old Caucasian female, single, employed	PNES, adult onset, duration 2 years; chronic fatigue syndrome, hypothyroidism	Obsessive Compulsive Disorder, AD/HD	Discontinued treatment
5	28-year-old Caucasian male, single, unemployed	PNES, adult onset, duration 1 year; history of TBI in adolescence	Substance abuse and anxiety disorder secondary to TBI	Consult only; PNES stopped when neurologist told him 'You don't have to do that anymore'.
6	34-year-old Caucasian female, divorced, unemployed, receives public disability benefits	PNES, adult onset, duration 2 years; mesial temporal sclerosis; hypertension, migraine headaches	PTSD, major depression, dependent personality disorder, learning disabilities by history	PNES continue
7	44 yr. old Caucasian female, single, employed	Left hippocampal Atrophy; PNES, adult onset, duration 'many years'; status p/o cervical cancer	PTSD, mixed anxiety and depression	PNES eliminated and PTSD resolved with EMDR (seven sessions); anxiety and depression managed with prescribed medication
8	27-year-old Caucasian male, single, unemployed	PNES, adult onset, duration 2 years; history of head injury without loss of consciousness	PTSD; Psychotic Disorder NOS; AD/HD by history	Refused EMDR; PNES continue; hallucinations decreased with prescribed medication

PTSD = post-traumatic stress disorder. EMDR = eye movement desensitization and reprocessing. TBI = traumatic brain injury. SLE = systemic lupus erythematosus.

2004. The complex partial seizures endured from ages 3 to 14 before being satisfactorily controlled with prescribed medications. The patient has comorbid PTSD as a result of seeing his brother killed in a motorcycle accident, and borderline intellectual functioning. The patient indicates that

he experiences his PNES nightly. He states that he is amnesic for these episodes.

Mental health assessment revealed that the patient's PNES began in 2003 after his father developed significant cardiac problems requiring several visits to a hospital cardiac care unit. The

patient indicated that he was very afraid of seeing his father die as he had watched his brother die. It is important to note that the patient was at home alone with his father during daytime.

Although his appropriateness for EMDR therapy was in doubt because of borderline intellectual functioning, i.e., he may not have been able to understand the EMDR protocol, continuing psychological treatment was offered to this patient. He stated that he was going on vacation with his family and would decide if he wanted to continue after he returned from that vacation. He subsequently decided that he did not want to continue with psychological treatment. This patient was seen for an intake consultation only. Follow-up reveals no change in his status.

### *Case Study 2*

This patient is a 40-year-old Caucasian female who is married, the parent of two teenage sons and employed. Her neurological diagnosis was PNES, which began in 1998. She experienced two or three seizure episodes monthly. Other medical diagnoses included systemic lupus erythematosus (SLE) and status p/o hysterectomy for uterine cancer. Comorbid mental health disorders included PTSD and major depression. The patient recounts witnessing and experiencing extreme physical and verbal abuse by her father from the time she was 3 years of age until she was 16.

This individual readily admitted to suppressing fear, rage and distress. She participated in 19 counselling sessions over a period of 10 months, six of which were EMDR sessions. After EMDR treatment, this patient's PNES were resolved and eliminated. Her major depression was managed with the medication Effexor. Follow-up 18 months after treatment reveals that she continues to be seizure-free. Her SLE is controlled with prescribed medications, and there has been no recurrence of cancer. She continues full-time employment in a skilled occupation.

### *Case Study 3*

This patient is a 55-year-old Caucasian male who is married and employed. His neurological diagnosis is PNES. The seizures were described as jerking of upper and lower extremities and an aura consisting of an out-of-body feeling as well as the smell of sulphur. He had no other medical illnesses. Comorbid mental health disorders included major depres-

sion with suicidal ideation and dissociative disorder with depersonalization. The patient described what could be considered traumatic grief after the death of his seriously disabled son in 2001. The PNES began after this death and increased in frequency to weekly occurrence at the time of referral. The patient participated in two counselling sessions then discontinued treatment. He was unwilling or unable to see any connections between PNES and his traumatic grief. He did agree to a psychiatric consultation for medication management. He agreed to take an antidepressant for a time. Follow-up reveals no change in his status.

### *Case Study 4*

This patient is a 29-year-old Caucasian female who is single and employed. She was diagnosed with PNES in 2004 pursuant to video EEG monitoring. Her seizures, which began in 2002, were described as whole-body flaccidity. Other medical diagnoses included chronic fatigue syndrome and hypothyroidism. Comorbid mental health disorders were obsessive-compulsive disorder and Attention Deficit Hyperactivity Disorder (AD/HD). This young woman's family history is significant. She is a twin and one of four daughters, all of whom have multiple rheumatic diseases, as does their mother. During her formative years, the patient's father was dependent on alcohol and, according to her, was verbally abusive. She described the home and family environment as chaotic and dysfunctional.

The patient participated in three counselling sessions then discontinued treatment because of conflicts with employment. She received no EMDR. She has been lost to follow-up.

### *Case Study 5*

This patient is a 28-year-old Caucasian male who is single, unemployed and living with his parents. PNES were diagnosed in 2005 pursuant to video EEG monitoring. This patient's psychogenic symptoms included lightheadedness, falling and whole-body shaking.

The patient has a history of status post-operative evacuation of a subdural haematoma with left temporal and frontal lobe involvement resulting from a skateboard accident at the age of 16. Comorbid mental health diagnoses included substance abuse and anxiety disorder secondary to brain injury.

This patient was seen for an intake consultation only. His PNES resolved after the treating neuro-

ogist told him 'You don't have to do that anymore'. To date, this patient has not had a recurrence of his seizures. He has been referred to the state vocational rehabilitation agency for vocational training and job placement.

### Case Study 6

This patient is a 34-year-old Caucasian female who is divorced, unemployed and receiving public disability benefits. Her PNES began in 1998 after the dissolution of an especially chaotic, brief marriage. She was diagnosed with PNES pursuant to video EEG monitoring done on at least three different occasions beginning in 2000 and concluding in 2005. Brain scan evidence revealed mesial temporal sclerosis. Medical history included a febrile seizure at the age of 3. Other medical diagnoses included migraine headaches. Comorbid mental health disorders included PTSD, major depression, dependent personality disorder and unspecified learning disabilities by history.

The patient's PTSD developed when she was 13 as a result of witnessing her father being beaten by an irate customer. Trauma symptoms were exacerbated by her experiencing extreme and ongoing verbal abuse in a dysfunctional family environment. This patient's seizures occurred weekly and were described as groaning and moaning, asynchronous body jerks with pelvic thrusting and back arching, face contortions, grimacing and motionless stares.

The patient participated in 23 counselling sessions over a period of 20 months. One EMDR session was conducted during which the patient had a seizure. She had seizures during other sessions as well and was reported to have similar 'spells' in her doctor's office. There has been no resolution of seizures to date. She believes that she must retain disability benefits and remain in her present environment to survive. The patient has a limited range of expressions for negative affect and limited skills for self-soothing.

### Case Study 7

This patient is a 44-year-old Caucasian female who is single and employed. Her neurological diagnoses include questionable complex partial seizures because of left hippocampal atrophy, and PNES. The patient's seizures occurred two to three times per week and were described as facial contortions, grimacing, tensing of the arms, shoulders

and upper chest, and olfactory sensations. The patient has a history of cervical cancer. Comorbid mental health diagnoses include PTSD and mixed anxiety and depression. The patient's PTSD evolved from experiencing and witnessing extreme verbal and physical abuse by an alcoholic father from the age of 6 to 13; then, in adult life, she experienced traumatic grief as a result of seven deaths of family members or close friends during a 12-month period. Some were from natural causes, some were accidents and one was a suicide-homicide.

The patient completed 22 counselling sessions over a period of 14 months. Seven EMDR sessions were conducted. The patient's seizures and symptoms of PTSD were eliminated with EMDR. Symptoms of mixed anxiety and depression have been lessened substantially with the prescribed medication Lexapro.

### Case Study 8

This patient is a 27-year-old Caucasian male who is single, unemployed and living with his parents. The neurological diagnosis is PNES diagnosed pursuant to video EEG monitoring in 2004. The patient's seizures began in 2002 after a motor vehicle accident and are described as hypnotic-like body jerks and sporadic tics. The patient has a history of mild head injury without loss of consciousness sustained in the aforementioned accident. He has some post-traumatic stress symptoms secondary to this event. He experiences many somatic complaints (numbness and tingling, tinnitus, visual and auditory hallucinations, and mood swings). The current psychiatric diagnosis is Psychotic Disorder NOS medicated with Risperdol. The patient's hallucinations are coming under control with this medication. He also has AD/HD by history. Neuropsychological evaluation and brain MRI are reported to be within normal limits.

The patient completed 10 counselling sessions over a 12-month period. He refused treatment with EMDR because he found it too emotionally stressful; his stereotyped body tics continue, especially when he is agitated or angry. This patient is fixated on obtaining Social Security disability benefits.

## DISCUSSION

EMDR was effective in eliminating PNES that were trauma-based in two of three patients who followed through with psychological treatment. They

have remained seizure-free. Of four individuals who appeared for consultation only or discontinued treatment early on because of travel difficulties, work conflicts or personal-family reasons, only one is seizure-free. None of these four was exposed to EMDR.

One patient was treatment resistant or reluctant. She had a seizure (motionless stare) during a session and was unable to comply with the EMDR protocol. This appeared to be dissociative. Had dissociative disorder been diagnosed earlier, the preparation needed for treatment of dissociation with EMDR could have been done, possibly resulting in a different outcome. This individual has a history of 'learning disabilities that required special education' according to her family, and appears to be of low average to borderline intellectual functioning. The latter condition has been noted in previous literature (McDade & Brown, 1992) to be a poor prognostic sign. This patient resides in a family environment characterized by highly evocative emotional expression. It may be that PNES net positive attention in an otherwise harsh environment; they may represent a coping mechanism, an adaptation to maltreatment. It should be noted that offering to remove her seizures may have threatened her livelihood, i.e., the disability check.

Two patients in this study had sclerosed mesial temporal (hippocampal) structures (MTS). In one case, the MTS was believed early on to be the possible cause of questionable complex partial seizures; however, the MTS proved to be an incidental finding only. Although MTS is a common cause of temporal lobe epilepsy, it is also seen in persons without seizures (Benbadis et al., 2002) but with trauma histories (Cozolino, 2002; Solomon & Heide, 2005). In the latter, perceptual representations of sensations and actions associated with trauma are stored as an episodic memory in the hippocampus (Stickgold, 2002). Both MTS patients in this study were complex trauma survivors and for both, epileptic seizures were ruled out.

Participants in this study were from a referral epilepsy centre and thus may be different (e.g., more males) from the general population of patients with PNES, which tend to be predominantly female. However, at this particular regional centre, 52% of patients are men (Benbadis et al., 2002). They were indeed typical in terms of age of onset, being refractory to multiple anti-epileptic drugs and having comorbid psychopathologies and psychosocial stressors described in the published literature.

## CONCLUSION

This study is among the first to examine the effectiveness of EMDR specifically in the treatment of trauma-based PNES. EMDR appeared to work well in a number of cases to eliminate PNES and treatment gains have been maintained for more than 12 months. These results are consistent with or better than the outcomes reported by Walczak et al. (1995), Kanner et al. (1999) and Reuber and House (2002). Controlled studies are needed to evaluate the efficacy of EMDR compared with cognitive behavioural therapy with this patient population. Long-term studies are also needed to determine outcomes in terms of lingering disability, employment, psychosocial problems and perceived quality of life.

PNES present the dilemma of a heretofore unexplained somatic and psychological symptom complex that has challenged traditional neurological and psychiatric explanations. Results of this study suggest a new perspective, that PNES may represent an expression of a trauma syndrome with physical and emotional elements including dissociation, activation of arousal, anxiety and overreaction to even mild stressors. Viewing PNES from this neuropathophysiology of trauma perspective opens the way to treatment with somatically effective therapies including EMDR.

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