**Photosensitive Self-Induced Seizures Since Childhood**

**Crises Epilépticas Auto-Induzidas Desde a Infância**

**Eduardo Palha-Fernandes, M.D.1**

**Ariana Teles, M.D.2**

**Amélia Mendes, M.D. 3**

**1**Departmentode Psiquiatria e Saúde Mental, Unidade Local de Saúde do Alto Minho, Viana do Castelo, Portugal

**2** Serviço de Pediatria, Unidade Local de Saúde do Alto Minho, Viana do Castelo, Portugal

**3** Unidade de Neurologia, Unidade Local de Saúde do Alto Minho, Viana do Castelo, Portugal

Corresponding Author and Reprints: Eduardo Palha-Fernandes

Contact: [eduardopalhafernandes@gmail.com](mailto:eduardopalhafernandes@gmail.com) // Telephone: (+351) 912626637

Address: Departamento de Psiquiatria e Saúde Mental, Hospital de Santa Luzia – Estrada de Santa Luzia 4904-858 Viana do Castelo, Portugal

Disclosure/Conflicts of interest/Subsidies or grants: nothing to declare.

Brief title: Self-induced seizures

**Photosensitive Self-Induced Seizures Since Childhood**

**Crises Epilépticas Auto-Induzidas Desde a Infância**

**Abstract**

A 15-year-old girl was admitted to the emergency room because of a bilateral tonic-clonic seizure. Family reported that the episode began with rapid hand movements in front of the patient’s eyes while looking at the sun. The patient has a history of being assisted by the emergency room due to similar events since the age of eight. Most occurrences were associated with episodes of frustration. The review of the literature has shown that this type of phenomenon, designated in some studies by sunflower syndrome, may be undervalued in patients with photosensitive epilepsy. Despite the unknown etiology, there are several reasons why patients experience this type of behavior, emphasizing the need of a multidisciplinary approach.

**Resumo**

Uma jovem de 15 anos foi admitida no Serviço de Urgência após ter sofrido crise epiléptica tónico-clónica bilateral. A família relatou que o episódio surgiu na sequência de ter iniciado movimentos rápidos das mãos na frente dos olhos enquanto olhava para o sol. A doente havia sido assistida, por diversas vezes, no Serviço de Urgência, devido a eventos semelhantes, desde os 8 anos de idade. A maioria dos episódios estava associada a episódios de frustração. A revisão da literatura mostrou que esse tipo de fenómeno, designado em alguns estudos por “Sunflower syndrome”, pode ser desvalorizado em pacientes com epilepsia fotossensível. Apesar da etiologia desconhecida, existem várias razões pelas quais os pacientes apresentam este tipo de comportamento, enfatizando a necessidade de uma abordagem multidisciplinar.

**Keywords**

Epilepsy. Photosensitive epilepsy. Photostimulation. Seizure.

**Introduction** Self-induction is a type of seizure precipitation employed by patients to produce seizures on demand (1). Typically, patients will stare at a light source while waving their abducted fingers in front of their faces or will perform other behaviors that create a similar flickering effect (2). Seizures include eyelid myoclonia with or without absences seizures, though some patients can go on to have generalized tonic-clonic seizures (3) .

**Case Report** A 15-year-old girl was admitted to the emergency room (ER) due to a seizure event. It was a self-induced photo-stimulus episode where the patient stared at the sun while rapidly moving her fingers in front of her eyes. It was then followed by myoclonus-like body movements, and loss of consciousness with open eyes and sialorrhea.

Family reported that at the age of eight, she developed the habit of watching television extremely close to the screen. They further state that one time she lost vision bilaterally for a few seconds and recovered spontaneously. Neurological and ophthalmological examinations were normal. Within the same setting, she has presented similar responses of exaggerated opening of eyes, deviation of the gaze to one side and repetitive movement of the hand in front of her eyes. The patient has no recollection of these behaviors.

Six months later the first ER admission, she had an episode described as a tonic-clonic seizure with postictal vomiting, tongue bite and occipital trauma. She was submitted to a cranial CT, which was unremarkable. The patient was under an antiepileptic drug (no accessible registry) without new seizures for three years.

At twelve years old she had a new generalized seizure which resulted in head injury and abrasive skin lesions. Valproate was initiated (20 mg/kg). Her grandmother revealed that the seizure came up after the patient waved one hand before her eyes during an anxiety episode. Following this event, the patient had four similar ER admissions within two years. She was referred for psychiatric evaluation.

The patient and her relatives associated the seizures with episodes of frustration or attention-grabbing. She reported that she feels bound to trigger photostimulation, especially on sunny days. Those maneuvers do not always trigger a seizure however. Sometimes, she needs to repeat the movement several times during the day for a seizure to develop. She cannot trigger a seizure with artificial light, only using sunlight. Non-induced seizures were denied. There is no family history of epilepsy or relevant chronic diseases.

A brain magnetic resonance imaging was performed. It did not reveal any structural abnormalities. The patient also underwent an electroencephalogram (EEG) with intermittent light stimulation. Results were normal. The cognitive evaluation disclosed a lower than average IQ (72), and a discrepancy between verbal and achievement intellectual quotients; major difficulties were noted in similarities, vocabulary and comprehension tests.

**Discussion** Self-induced photosensitive epilepsy is a rare condition (3). Literature is scarce, but in some studies this type of phenomenon is designated by sunflower syndrome (2). It may be undervalued in patients with photosensitive epilepsy (4,5). Since the first case reported in 1932 (6), some authors (7-10) tried to estimate the prevalence of this phenomenon which remains extremely variable, mostly due to case detection differences (11).

More recently, in the Panayiotopoulos (2) experience of 442 patients with an onset of nonfebrile seizures from age 0 through 15, only five (1.3%) had self-induced seizures. The same author estimates that the age of onset ranges from infancy to mainly early childhood and has a 70-80% female predominance. Despite the unknown etiology, Ng (11) describes several reasons why patients may have this type of behavior – compulsion, willful avoidance of stress or escape from unpleasant situations or boredom, hedonistic motivations, obtain a sense of control (mastery) over the seizures, attention-seeking, self-treatment.

Unlike our reported case, patients do not usually evolve to generalized tonic-clonic seizures and EEG abnormalities can be found (2,3). Baumer (3) indicates valproate monotherapy as the most effective treatment for self-induced photosensitive epilepsy. This drug did not restrain our patient from performing the hand movements or having seizures. As shown in this case report, this condition seems to be notoriously resistant to therapy (12-13). The further association with psychiatric factors justified the importance of a neuropsychiatric multidisciplinary approach.

One of the main obstacles to diagnose self-induction in photosensitive patients is that self-inducing patients are usually embarrassed to admit it. It sometimes requires long-term video-EEG monitoring as self-induction may occur after the technician leaves the room (14). This difficulty has led to some discussion on whether patient’s hand waving is an attempt to induce flickering or a feature of the seizure itself (15). Although Panayiotopoulos (1) speculates that both can happen, our case study shows that the first hypothesis seems definitely true. Our findings rely on our patient’s willingness to discuss her habit.

**References**

1. Panayiotopoulos CP. A clinical guide to epileptic syndromes and their treatment. London: Springer Science & Business Media Ltd. 2010:497-528.
2. Ames FR, Saffer D. The sunflower syndrome: a new look at “self-induced” photosensitive epilepsy. J Neurol Sci. 1983;1;59(1):1-1.
3. Baumer, Fiona M, Porter B. Clinical and Electrographic Features of Sunflower Syndrome. Epilepsy Research. 2018;142:58-63.
4. Binnie CD, Darby CE, De Korte RA, Wilkins AJ. Self-induction of epileptic seizures by eyeclosure: incidence and recognition. J Neurol Neurosurg Psychiatry. 1980;43(5):386-9.
5. Darby CE, Korte RA, Binnie CD, Wilkins AJ. The Self‐induction of Epileptic Seizures by Eye Closure. Epilepsia. 1980;1;21(1):31-42.
6. Radovici A. Epilepsie reflexe provoquee par excitations optiques des rayons solaires. Rev Neurol. 1932;1:1305.
7. Antebi D, Bird J. The facilitation and evocation of seizures. A questionnaire study of awareness and control. Br J Psychiatry. 1993;162(6):759-64.
8. Zifkin B, Andermann F, Rowan AJ, Beaumanoir A, editors. Reflex Epilepsies and Reflex Seizures. New York: Lippincot-Raven; 1998.
9. Kasteleijn-Nolst DT. Photosensitivity in epilepsy. Electrophysiological and clinical correlates. Acta Neurol Scand. Supplementum. 1989;125:3-149.
10. Jeavons PM. Photosensive Epilepsy: A Review of the Literature and a Study of 460 Patients. London: Heinemann; 1975.
11. Ng BY. Psychiatric aspects of self‐induced epileptic seizures. Aust N Z J Psychiatry. 2002;1;36(4):534-43.
12. Ames FR, Enderstein O. Clinical and EEG response to clonazepam in four patients with self-induced photosensitive epilepsy. S Afr Med J. 1976;50(3F):1432-4.
13. Rail LR. The treatment of self-induced photic epilepsy. Proceedings of the Australian Association of Neurologists, Sydney: Australian Association of Neurologists, 1973; 9:121–123
14. Kasteleijn‐Nolst Trenité DG. Provoked and reflex seizures: surprising or common?. Epilepsia. 2012;1;53(s4):105-13.
15. Livingston S, Torres IC. Photic epilepsy: report of an unusual case and review of the literature. Clinical pediatrics. 1964;3(5):304-7.