IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 25, Issue 4 Ser. 4 (April. 2026), PP 30-32
www.iosrjournals.org

Writing Induced Reflex Epilepsy: A Case Report

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Abstract:
Objective: *Reflex epilepsies are characterized by seizures consistently triggered by specific stimuli. Writing-induced epilepsy is a rare form of reflex epilepsy.*
Case presentation: *We report a 16-year-old right-handed girl with no relevant medical history who presented with stereotyped involuntary movements of the right upper limb exclusively triggered by handwriting. The episodes consisted of brief, repetitive myoclonic jerks appearing immediately after initiating writing and ceasing upon interruption of the task.*
Neurological examination was normal. Brain MRI was unremarkable. Interictal EEG showed rare generalized spike-and-wave discharges. Video-EEG monitoring with a handwriting activation paradigm reproducibly induced clinical myoclonic seizures associated with focal then generalized spike-and-wave and polyspike-and-wave discharges, confirmed by electromyography.
Levetiracetam was discontinued due to depressive side effects. Lamotrigine followed by sodium valproate combination therapy failed to achieve complete seizure control. A significant reduction in seizure frequency was observed after replacing handwriting with computer typing.
Conclusion: *This case highlights a rare form of writing-induced reflex epilepsy confirmed by video-EEG, emphasizing the importance of non-pharmacological strategies in management.*

Date of Submission: 10-04-2026 Date of Acceptance: 20-04-2026

I. Introduction

Reflex epilepsies are a group of epileptic disorders in which seizures are consistently elicited by specific sensory, cognitive, or motor stimuli. Among them, writing-induced epilepsy, also known as graphogenic epilepsy, is exceptionally rare and incompletely understood.

Writing-induced epilepsy, sometimes referred to as graphogenic epilepsy, is characterized by seizures triggered exclusively during handwriting and is often associated with motor or myoclonic manifestations. We report a case of an adolescent girl with writing-induced reflex epilepsy confirmed by video-EEG monitoring.

II. Case Presentation

A 16-year-old right-handed female with no significant past medical history was referred for evaluation of recurrent stereotyped motor events affecting the right upper limb over a six-month period.

The episodes were strictly triggered by handwriting and consisted of brief, repetitive myoclonic jerks of the right hand. They occurred immediately after initiation of writing and resolved upon cessation of the task. There was no impairment of consciousness or secondary generalization. The condition resulted in significant academic disability.

The patient had been previously misdiagnosed with a functional neurological disorder, delaying appropriate evaluation.

Neurological examination between episodes was normal. Brain MRI revealed no abnormalities.

Interictal EEG demonstrated rare generalized spike-and-wave discharges. Video-EEG monitoring with a handwriting activation protocol reproducibly triggered clinical myoclonic seizures associated with focal spike-and-wave and polyspike-and-wave discharges with rapid generalization. Electromyography confirmed the myoclonic nature of the events.

A diagnosis of writing-induced reflex epilepsy was established.

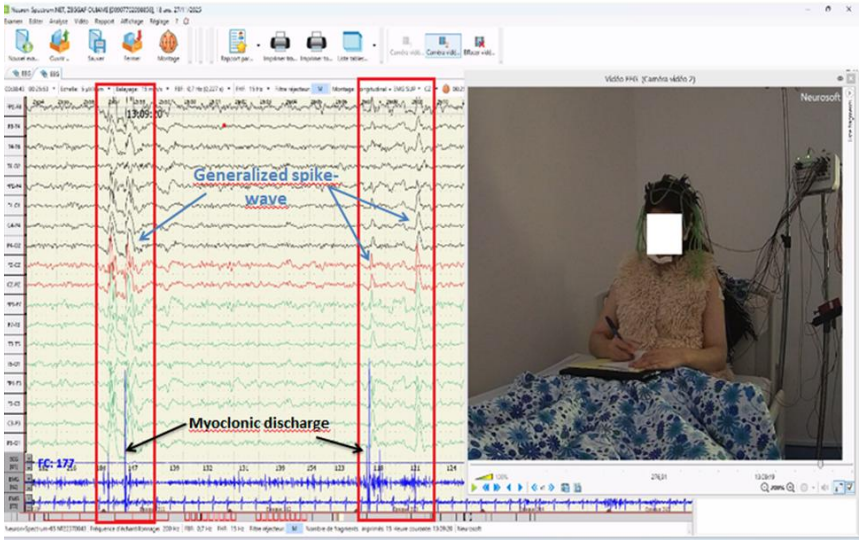

Figure 1. Video-EEG during handwriting-induced reflex seizure.

EEG recording during handwriting demonstrates generalized spike–wave discharges (arrows). Electromyography shows time-locked myoclonic bursts corresponding to clinical myoclonic jerks, confirming electroclinical correlation

Treatment and Outcome :

Levetiracetam was initiated but discontinued due to depressive symptoms. Lamotrigine was introduced, followed by combination therapy with sodium valproate; however, seizure control remained incomplete.

A significant clinical improvement was observed after behavioral modification consisting of replacing handwriting with computer-based typing, which markedly reduced seizure frequency.

III. Discussion

Reflex epilepsies are characterized by seizures triggered by specific and reproducible stimuli and represent a well-defined but heterogeneous group of epileptic syndromes [1]. Writing-induced epilepsy is a rare subtype, with only isolated cases described in the literature [2,3].

The diagnosis in this case was supported by strict reproducibility of seizures during handwriting, involvement of the dominant hand, and electroclinical correlation demonstrated on video-EEG. Similar patterns have been reported in praxis-induced reflex seizures associated with spike-and-wave or polyspike-and-wave discharges [2, 4, 7].

The pathophysiology remains incompletely understood. Current hypotheses suggest activation of distributed cortical networks involving motor, premotor, and parietal associative areas during complex learned motor tasks such as writing. In susceptible individuals, this may lead to epileptogenic synchronization with possible secondary generalization [4].

The main differential diagnosis is task-specific dystonia (writer's cramp). However, EEG abnormalities and electroclinical correlation support an epileptic mechanism in this case [2,4].

Initial misdiagnosis as a psychogenic disorder is not uncommon and highlights the importance of considering reflex epilepsy in patients with stereotyped, reproducible, task-specific events. Video-EEG monitoring remains essential for accurate diagnosis [3, 7].

From a therapeutic perspective, antiepileptic drugs remain the mainstay of treatment; however, response may be partial or insufficient. Non-pharmacological approaches aimed at avoiding or modifying the triggering stimulus can be highly beneficial [1, 3, 7].

In this case, substituting handwriting with computer typing significantly improved symptoms, underscoring the importance of individualized behavioral interventions.

IV. Conclusion

Writing-induced reflex epilepsy is a rare epileptic entity that requires careful clinical and electrophysiological evaluation for diagnosis. Recognition of this condition is essential to avoid misdiagnosis and to implement appropriate management strategies, including both pharmacological and behavioral approaches.

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