

Voluntary saccadic oscillations resembling opsoclonus (saccadomania)

Andrew J. Larner

MD FRCP (UK), was a Consultant Neurologist at the Walton Centre for Neurology and Neurosurgery in Liverpool, UK with a particular interest in dementia and cognitive disorders.



Correspondence to:

AJ Larner, Walton Centre for Neurology and Neurosurgery, Lower Lane, Liverpool, L9 7LJ. UK. E. andrew.larner2@nhs.net

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Introduction

Saccadic oscillations are instabilities of visual fixation which may take several forms. These are generally involuntary in nature and often pathological with localising value as part of the neurological examination [1]. Saccadic oscillations are often categorised according to whether or not there is an intersaccadic interval, present in square wave jerks and macrosquare wave jerks but absent in ocular flutter and opsoclonus (saccadomania). Such movements may be a consequence of structural, inflammatory, or paraneoplastic disease affecting the brainstem and/or cerebellum, hence require investigation.

Sometimes saccadic oscillations may be under voluntary control in the absence of brainstem or other pathology. For example, "voluntary nystagmus" describes brief (few seconds) bursts of high frequency (ca. 25Hz) low amplitude (ca. 1 degree) conjugate horizontal oscillations of back-to-back saccades, often induced by a vergence effort (i.e. these are saccades, not nystagmus, as there is no slow phase). Voluntary nystagmus, also known as voluntary flutter or psychogenic flutter, may in fact be a common, but easily overlooked, phenomenon [2,3]. In contrast, only occasional reports of voluntary saccadic oscillations resembling opsoclonus have appeared.

A further example of voluntary multidirectional saccadic oscillations of high amplitude and low frequency, resembling opsoclonus rather than voluntary nystagmus, is presented.

Case Description

The subject came to neurological attention purely by chance (social acquaintance) and hence only a clinical assessment could be made.

From his primary school years he had been able voluntarily to jiggle his eyes ("googly eyes") but thought nothing of it until a school friend commented, having thought these movements were simply normal and that everyone could make them. However, no family members were known to be able to make similar eye movements. He intuited no particular method or technique to make the movements, and did not feel they were effortful, although he had never tested for how long they could be sustained. He required glasses from his early years but the eye movements were never noted at eye examinations. They were associated with oscillopsia. There was no history of prior brain injury or infection.

Video recording clearly showed large amplitude low frequency multidirectional saccadic oscillations resembling opsoclonus. As the movements were not confined to the horizontal plane, a diagnosis of ocular flutter was not appropriate. In the absence of technical equipment (electro-oculography) it could not be said whether or not there was an intersaccadic interval. (You can view the recording by visiting the ACNR website: acnr.co.uk/case-report/voluntary-saccadic-oscillations-resembling-opsoclonus-saccadomania/).

Discussion

In 1994, Yee et al. described two subjects in whom saccadic oscillations resembling ocular flutter and opsoclonus appeared to be under voluntary control. These oscillations had horizontal, vertical and oblique or torsional components. Unlike voluntary nystagmus, these eye movements were capable of being sustained, sometimes for minutes, and were of low frequency (<10Hz) and high amplitude (up to 40 degrees) [4].

The individual reported here evidently had voluntary saccadic oscillations which could be produced on request, occurring in the absence of any underlying neurological or ophthalmological disorder. Although in the absence of technical equipment to assess presence or absence of intersaccadic intervals it cannot definitively be confirmed whether or not these movements are opsoclonus, they certainly resemble such movements in their directionality, amplitude, and frequency. These oscillations are evidently different from the high frequency small amplitude movements characterised as "voluntary nystagmus".

The prevalence of the ability to generate voluntary saccadic oscillations of this type is unknown, but other cases may be found which are not mentioned in the medical literature. For example, a well-known Spanish singer and actress of the 1960s-1980s, Marujita Díaz (1932-2015), was noted for her ability to make such voluntary eye movements (videos may be found on YouTube) which, after her death, were suggested to be nystagmus [5].

In the discussion of their Patient 1, Yee et al. stated that "when saccadic oscillations similar to ocular flutter and opsoclonus are found in patients who do not have other neurologic signs and symptoms, the possibility of a non-organic cause should be considered" [4]. This recom-

mentation may have been prompted by their suspicion that this patient, who had been referred to a neurology unit for clinical assessment following head trauma (a minor car accident resulting in shunt and whiplash), was making the eye movements intentionally. Additionally, they may have been prompted to this view by the previous characterisation of voluntary nystagmus as “psychogenic flutter”. When such patients are referred for assessment they require further evaluation (neuroimaging, psychological) as voluntary saccadic oscillations in this setting is a diagnosis of exclusion.

The current case description, in contrast to the patient of Yee et al., suggests that there is not necessarily anything “psychogenic” or “non-organic” about voluntary saccadic oscillations resembling opsoclonus (unless all our voluntary actions be deemed as such!) when observed in some members of the normal population. Hence evaluation for psychopathology is not necessarily indicated in commu-

nity members who can demonstrate this “skill” for entertainment.

The mechanism of voluntary saccadic oscillation of this type, resembling opsoclonus, is unknown. It might relate to an ability to suppress voluntarily the brainstem omnipause neurones in the pontine nucleus raphe interpositus which inhibit saccades, such that groups of burst neurones in the paramedian pontine reticular formation, normally inhibited by omnipause neurones, are activated, this being one of the mechanisms thought to underpin opsoclonus [6]. Positive feedback in the synaptic connections of burst neurones might also play a role [7]. It does not appear to be a “normal intrinsic capability” as proposed for voluntary nystagmus [2]. What evolutionary advantage, if any, that the ability to generate saccadic oscillations voluntarily provides is not apparent, but as a “party trick” it is certainly diverting and attention grabbing.

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