

LETTER TO THE EDITOR

# Magnetic field, nystagmus and serendipity

## *Campo magnetico, nistagmo e serendipità*

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**KEY WORDS:** nystagmus, magnetic resonance, magnetic field, vertigo, induced nystagmus

**PAROLE CHIAVE:** *nistagmo, risonanza magnetica, campo magnetico, vertigine, nistagmo indotto*

Dear Editor,

In these few lines I would like to tell what happened to me to highlight a phenomenon that in recent years is attracting more and more interest: the existence of a form of nystagmus induced by a magnetic field.

In the summer of 2007, I decided to perform functional MRI (1.5 T) on a group of healthy subjects (including myself) during a very short pulses of monoaural irrigation with cold water and on-line registration of the nystagmus in order to evaluate the event-related functional MRI responses, their spatial layout and the temporal dynamics of the activated cortical and subcortical regions in time-locking with the instant of injection. The research yielded interesting results<sup>1</sup>. Indeed, for the first time the temporal envelope of eye movement traces was not found to be significantly correlated with the blood-oxygen-level-dependent (BOLD) response on a time point basis. We attributed this phenomenon to various mechanisms, one of which would have become extremely interesting, although it would have gone almost unnoticed in this work. In fact, we wrote: “The identification of the very same time instant of nystagmus initiation on the traces was made problematic by the *existence of spontaneous nystagmus activity preceding the injection*, which could be related to the spontaneous vestibular stimulation recently described as a consequence of the exposure to strong magnetic fields in the MRI environment”<sup>2,3</sup>. I found that all subjects developed a robust horizontal nystagmus directed to the left while simply lying in the static magnetic field of an MRI machine, which persisted for the entire permanence in the magnetic field and disappeared as soon as one moved away from it (Fig. 1). For the first time, magnetic field induced nystagmus was highlighted and described. Even though I never published further confirmations, three years later I decided to talk about this “discovery” with David Samuel Zee and Daniele Nuti. A week later, David Samuel Zee, at the Kennedy-Krieger Institute at Johns Hopkins University in Baltimore, confirmed the existence of a magnetic field induced nystagmus and, a few months later, a paper was published which explained its characteristics and genesis in detail<sup>4</sup>. Over the years, numerous other works have been published on this topic, with obvious repercussions ranging from the pathophysiology of the vestibular system to occupational medicine and possible therapeutic applications<sup>5-10</sup>.

### *Conflict of interest statement*

The authors declare no conflict of interest.

Received: January 22, 2023  
Accepted: April 21, 2023  
Published online: July 28, 2023

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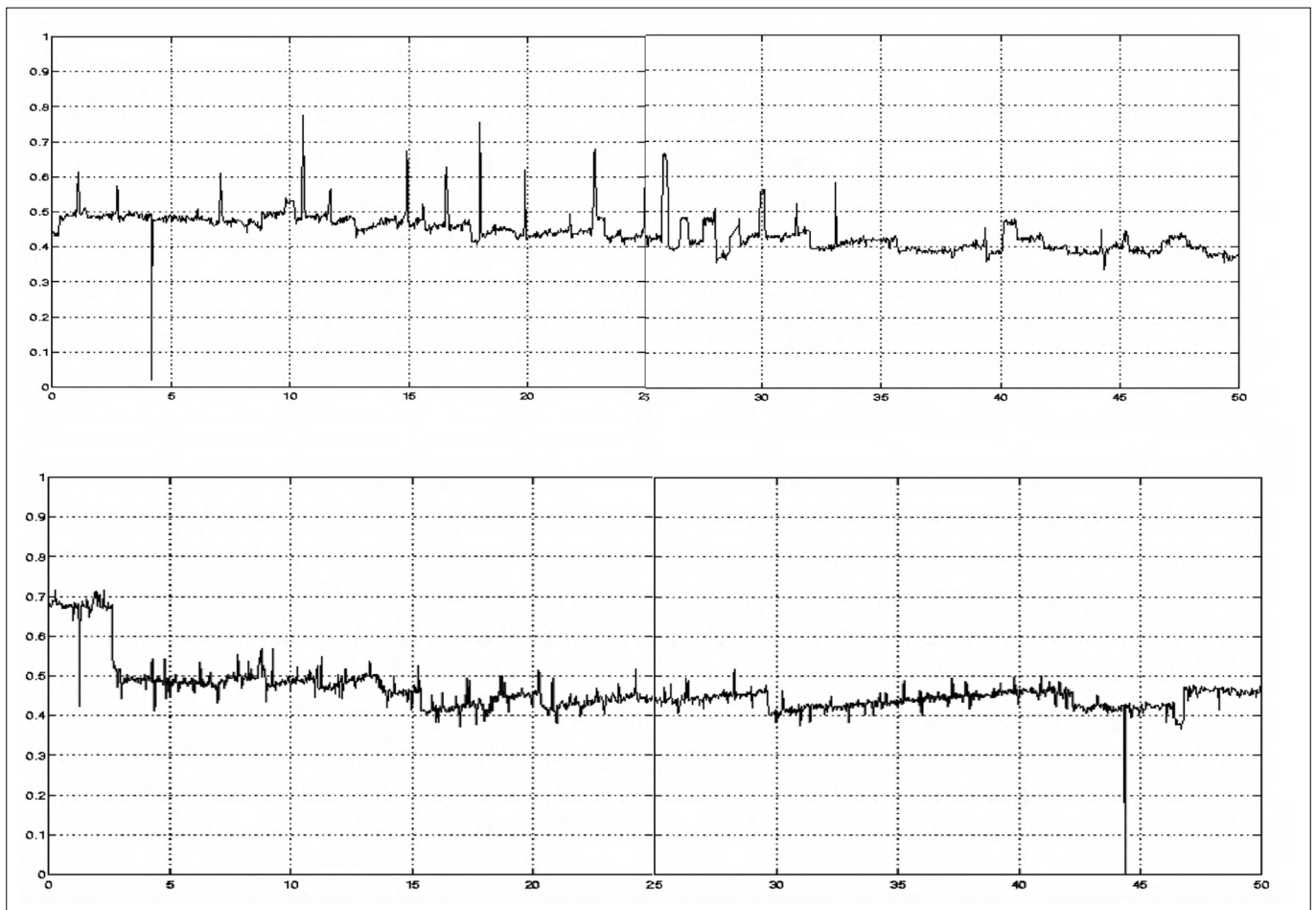
**How to cite this article:** Marcelli V, Marcelli E. Magnetic field, nystagmus and serendipity. Acta Otorhinolaryngol Ital 2023;43:360-361. <https://doi.org/10.14639/0392-100X-N2485>

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**Figure 1.** Left-beating nystagmus recorded in two subjects within the magnetic field.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Author contributions

VM: conceptualisation, data curation, formal analysis, supervision, writing – original draft, writing – review & editing; EM: conceptualisation, data curation, resources, Writing – review & editing

### Ethical consideration

Not applicable.

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