



Abnormal multisensory integration in migraine: a study of concurrent visual and somatosensory stimulation

BACKGROUND

- Merging of sensory information is an important process for all species. Co-application of bi-modal stimulations results in greater neural activation than the sum of each unimodal stimuli delivered independently.
- We have tested how the multisensory integration take place in episodic migraine patients without aura (MO), by evaluating the potential ability of bi-modal stimulations to affect the mechanisms of habituation.

METHODS

- We recorded somatosensory evoked potentials (SSEPs) in 20 healthy volunteers (HVs) and in 21 patients with interictal MO before (T0), during (T1), and after (T2) simultaneous visual stimulation with a black and white full-field checkerboard pattern.
- 600 sweeps were acquired for each condition and partitioned in 2 blocks of 100 sweeps for the calculation of habituation as the slope of the regression line between the 1st and the 2nd block of averaged N20-P25 SSEP amplitude response.

RESULTS

- In both groups the visuo-somesthetic stimulation changed the SSEP N20-P25 habituation seen at baseline, but in opposite way.
- In HVs the concurrent stimulation provoked a transient significant loss of habituation. Habituation quickly returns to normal at T2.
- In patients with MO, who had a deficient habituation at baseline, the simultaneous stimulation produced a significant amplitude decrement. Habituation loss quickly returns to T2.

DISCUSSION

- Our results suggest that the brain of a migraineur process multisensory information in a different way from healthy controls. Malfunctioning in these physiologic sensory processing mechanisms in migraine could lead to maladaptive changes, such as photo- and phono-phobia, sometimes presenting also interictally.
- Extending our study to patients during an attack would offer a unique opportunity to investigate defensive strategies against multisensory overload under conditions when baseline habituation is already reset to normal, and the multisensory integration is clinically more evident.

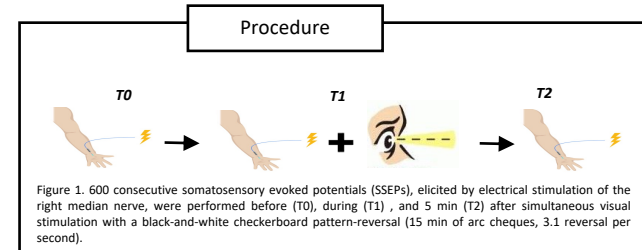


Figure 1. 600 consecutive somatosensory evoked potentials (SSEPs), elicited by electrical stimulation of the right median nerve, were performed before (T0), during (T1), and 5 min (T2) after simultaneous visual stimulation with a black-and-white checkerboard pattern-reversal (15 min of arc cheques, 3.1 reversal per second).

