

# Modulating cortical responsiveness by tACS in visual snow syndrome - a case report

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## Introduction

Studies<sup>1,2</sup> have shown migraineurs have an enhanced photic-drive response when exposed to a visual chirp compared to healthy controls. Visual snow syndrome (VSS) is associated with migraine, but patients have continuous visual symptoms indicating dysfunction of visual processing<sup>3</sup>. For this reason, we determined whether VSS patients show a similar reaction as migraineurs when exposed to a visual chirp stimulation. Additionally, we tested whether tACS stimulation modulates their reaction.

## Methods

One VSS patient (f, 37) with comorbid migraine was exposed to a visual chirp stimulation (5.55 – 60 Hz). 66 black and white reversals were presented per trial, 792 in total. A 64-electrode EEG-grid was used for the measurement and the occipital electrodes for the analysis. The power spectral density was calculated for stimuli responses and corrected for baseline. A wavelet transformation was applied before averaging the data. The patient received a total of 9 tACS stimulations (1.5 mA, 0.1 Hz, 20 min) over a period of 5 days between measurements.

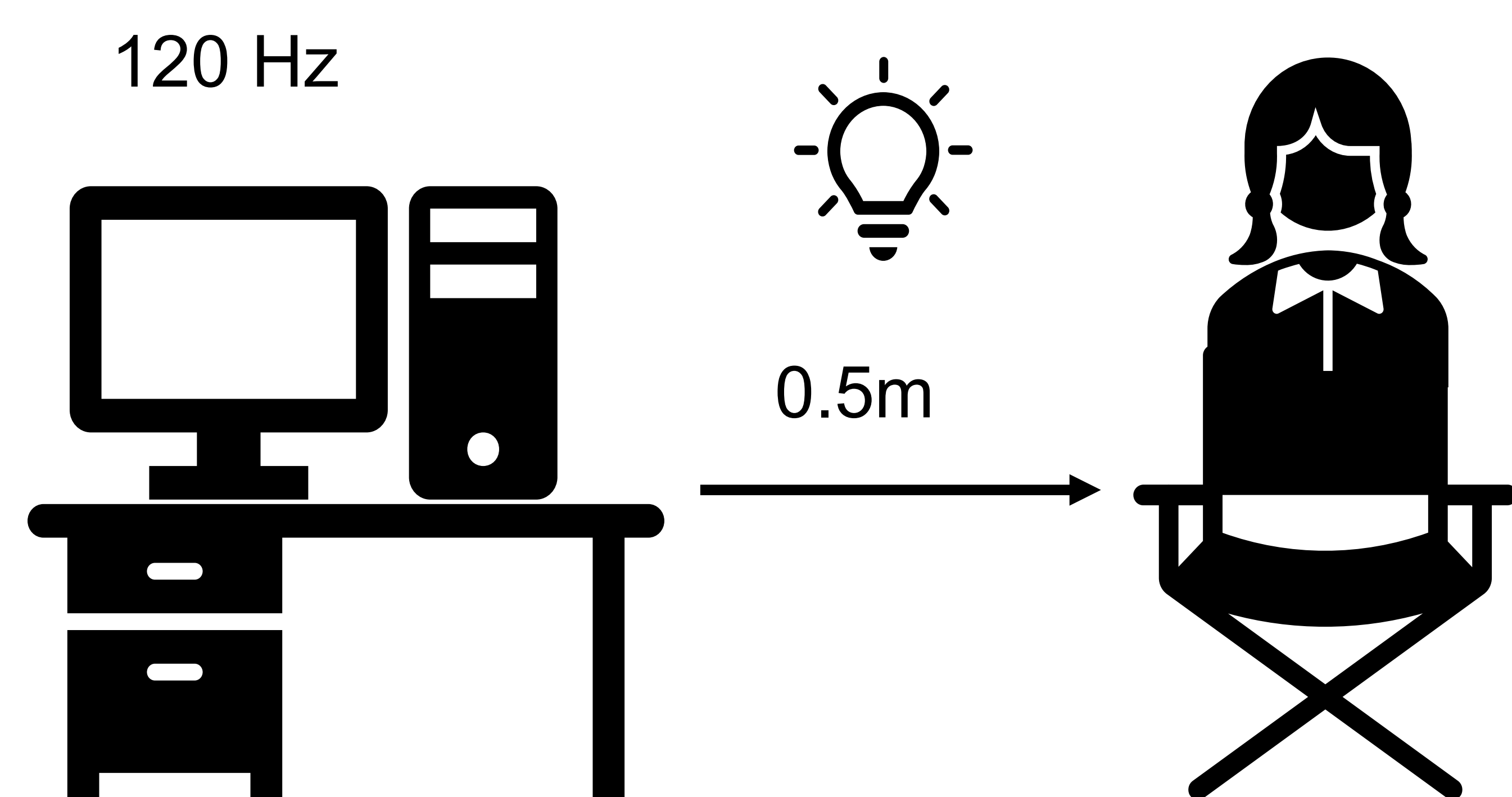


Figure 1: Setup

## Conclusion

This study shows that tACS stimulation can reduce the photic-drive response of VSS patients. Despite this being a case study, the results show that tACS might be a promising treatment option for VSS patients or people suffering from migraine.

## References

- 1 A. R. Gantenbein, P. S. Sandor, P. J. Goadsby, H. Kaube. Chirp stimulation: H-response short and dynamic, *Cephalalgia* 34 (7) (2014) 554-558. doi:10.1177/0333102413517777.
- 2 M. J. Perenboom, M. van de Ruit, R. Zielman, A. M. van den Maagdenberg, M. D. Ferrari, J. A. Carpay, E. A. Tolner. Enhanced pre-ictal cortical responsivity in migraine patients assessed by visual chirp stimulation, *Cephalalgia* 40 (9) (2020) 913–923. doi:10.1177/0333102420912725.
- 3 A. Klein, C.J. Schankin. Visual snow syndrome, the spectrum of perceptual disorder, and migraine as a common risk factor: A narrative review. *Headache*. 2021;61;1306-1313. doi: <https://doi.org/10.1111/head.14213>

## Results

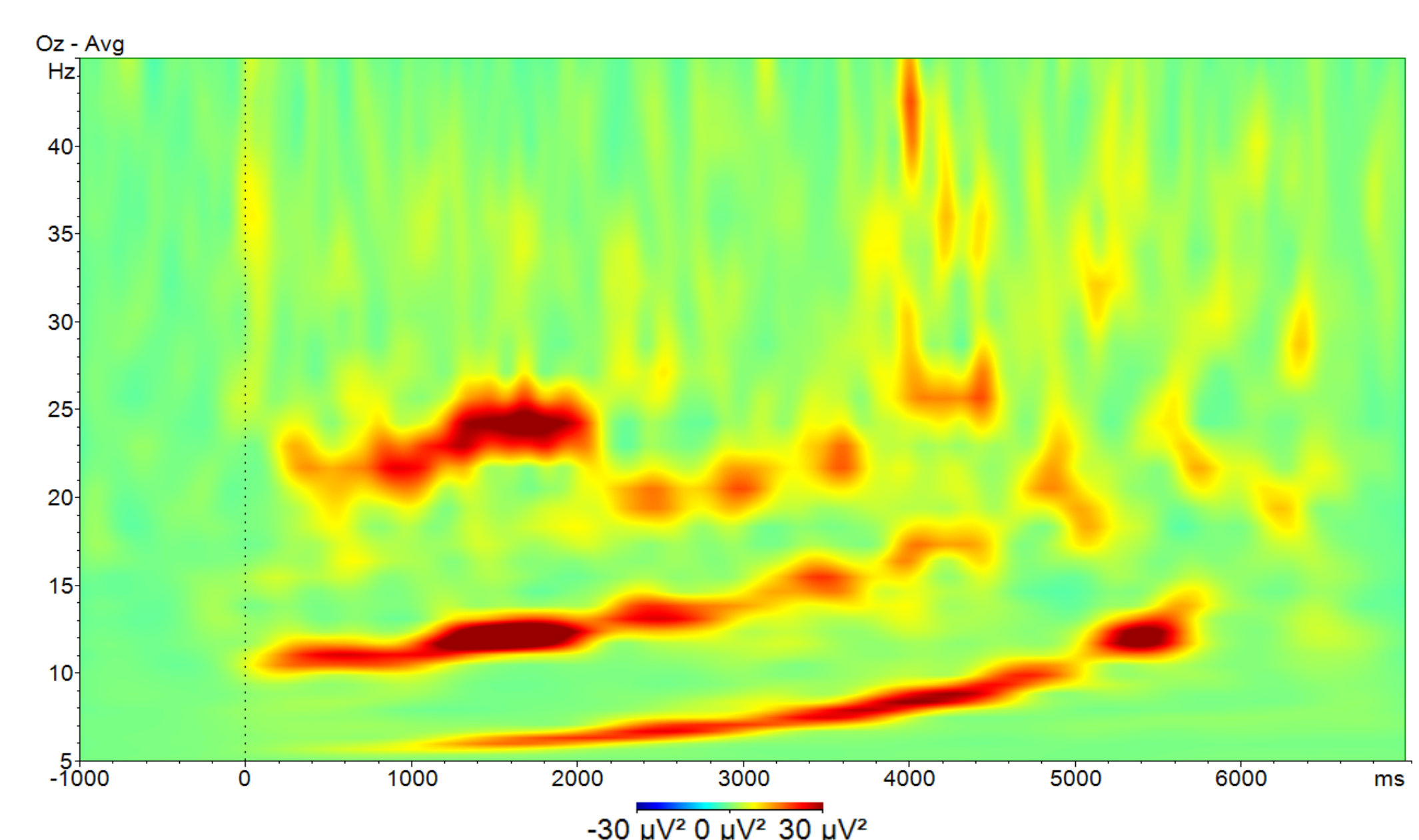


Figure 2: Pre-treatment measurement.

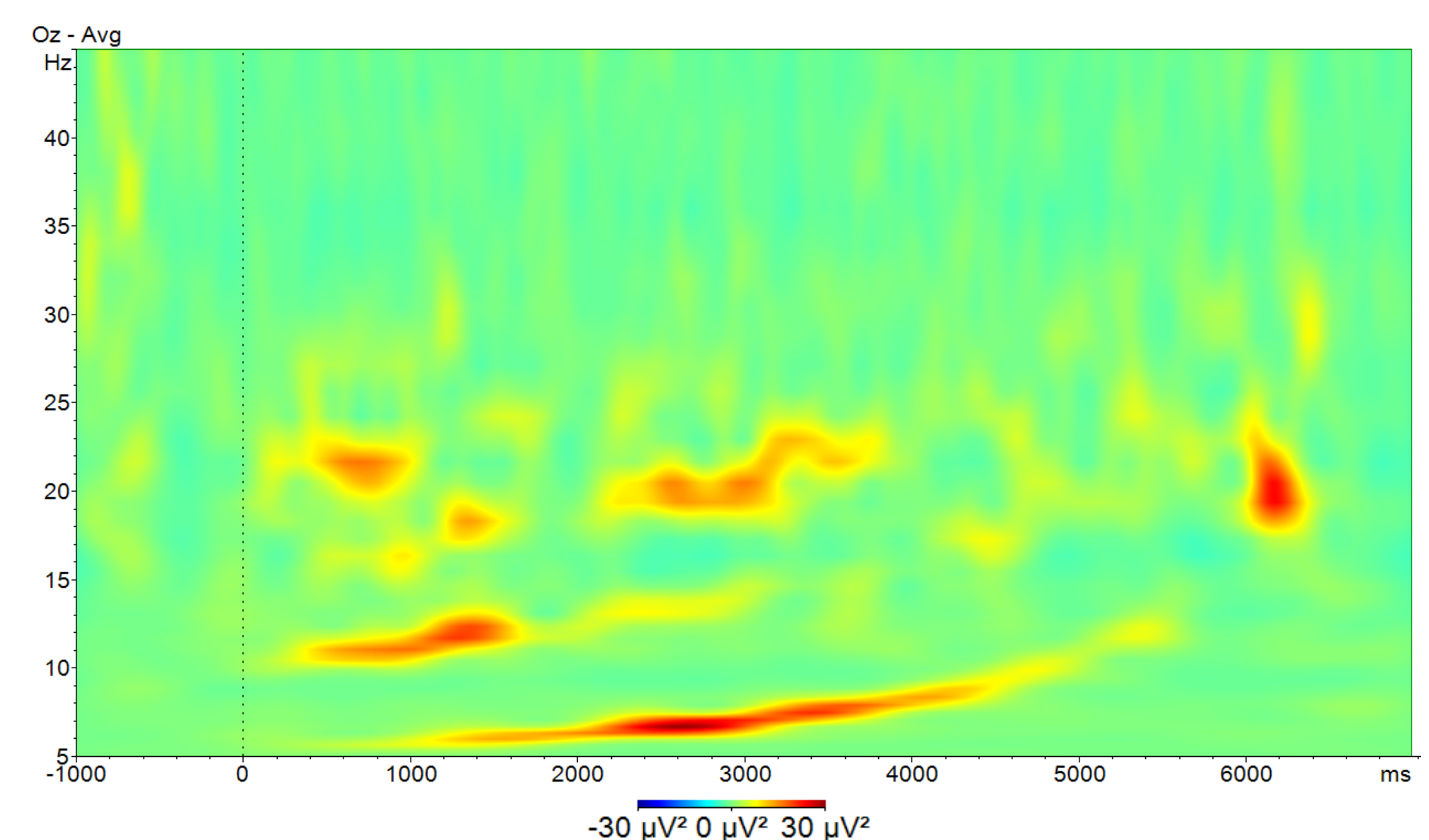


Figure 3: Post-treatment measurement.

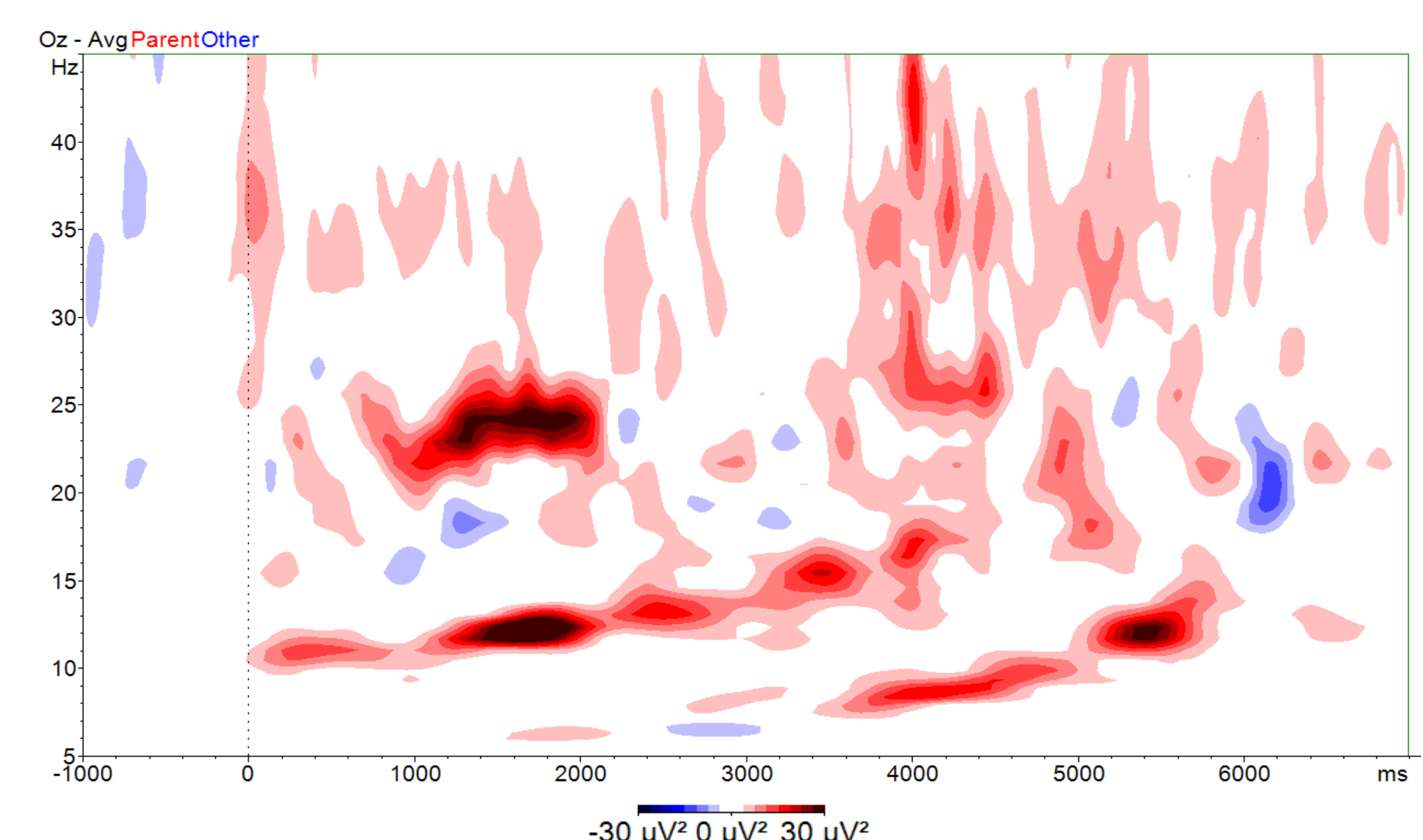


Figure 4: Pre- minus post-treatment measurement.