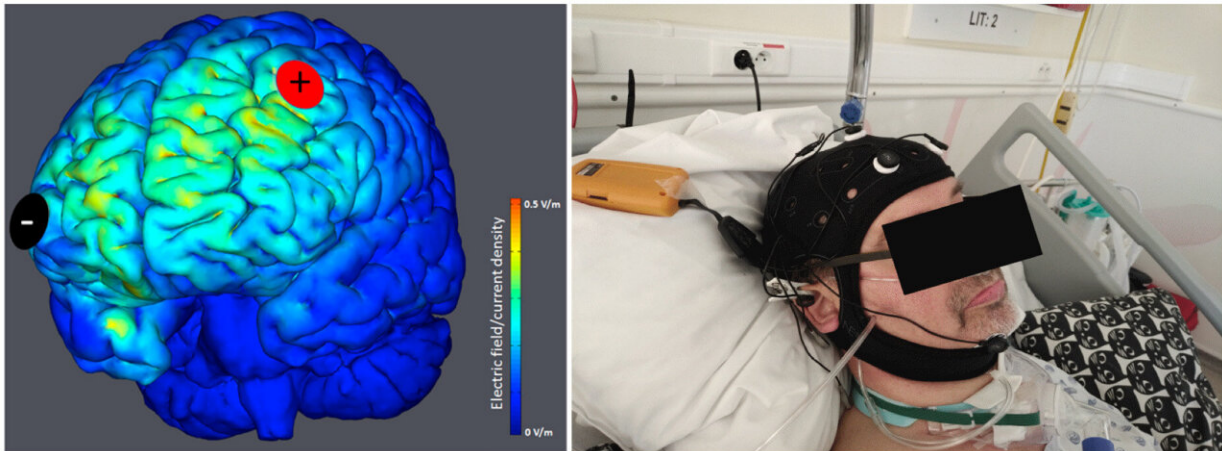


Encouraging new prospects for the treatment of consciousness disorders

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The transcranial direct current stimulation (tDCS) technique involves placing electrodes on the patient's skull. The prefrontal montage used in this study (left) represents the electric field targeting the prefrontal cortex. One of the devices used in the study (Startstim 8, Neurolectrics) is shown on the right on a post-coma patient. Credit: Coma Science Group / University of Liège

An international study led by the Coma Science Group of the University of Liège (BE) and involving more than ten institutions has tested transcranial direct current stimulation (tDCS) on a large number of patients suffering from consciousness disorders following severe brain injury. These results represent a significant advance in how we care for these patients and will enable us to refine the therapeutic strategies to

implement. This study is published in the *European Journal of Neurology*.

Treating patients with impaired consciousness following [severe brain injury](#) is a significant challenge for health care professionals, relatives and all stakeholders. Given the rarity of this condition, conducting large-scale [clinical trials](#) is highly complex.

Dr. Aurore Thibaut, FNRS Research associate and co-director of the Coma Science Group, is familiar with the problem. "Evidence-based treatment options to promote the recovery of sub-acute and chronic disorders of consciousness remain extremely limited. As a result, care teams face serious challenges, and patients' relatives are left uncertain about how to care for their loved ones. There is a crying need for large-scale, comprehensive multicentre studies to address these concerns."

For more than ten years, the Coma Science Group at the University of Liège has been exploring a non-invasive brain stimulation technique: [transcranial direct current stimulation](#) (tDCS). [Initial work](#) has shown that tDCS can improve the behavioral responses observed at the bedside of specific patients.

TDCS promotes brain plasticity by modulating the excitability of neurons with low electrical currents. This method, which is simple to use and safe, is particularly suitable for patients suffering from post-coma consciousness disorders in hospitals and at [home](#).

"Unlike previous single-center studies involving [small samples](#), a new GIGA-led study collected data from 62 patients from ten centers in five countries (Belgium, Germany, Italy, Russia and Spain). tDCS was administered in rehabilitation centers for four consecutive weeks, and its effects were measured using the [Coma Recovery Scale-Revised](#) for up to three months after the intervention," explains Aurore Thibaut.

"Although no overall beneficial effect was observed during the treatment phase, specific subgroups of patients responded at the three-month follow-up and showed a significant improvement in their behavioral responses compared with the control group."

Patients in a minimally conscious state, as opposed to a non-responsive state, and those with traumatic—rather than anoxic or vascular—brain injury were able to benefit from the technique. However, clinical improvements are limited and often transient, which means that this tool cannot be considered a revolutionary treatment.

"These promising results represent a major advance in how we consider and treat these patients," enthuses Dr. Géraldine Martens, FNRS research fellow at the Coma Science Group. "We must move beyond the generic term 'patients with disorders of consciousness' and embrace the complex nuances within this population, integrating diagnosis and etiology as determining factors in refining our therapeutic strategies."

"Conducting this type of multicenter trial involves a series of challenges: ethical regulations, data sharing, protocol adherence and data quality, among others. We are impressed and grateful for the power of this teamwork," concludes Dr. Nicolas Lejeune, FNRS postdoctoral fellow at the Coma Science Group. "We brought together clinicians and researchers from [diverse backgrounds](#) working in different health care contexts and adhered rigorously to a strict protocol, providing robust evidence. This success offers hope for future ambitious clinical trials."

This study proves, once again, that joining forces is the best solution to investigate new therapeutic options for rare and severe conditions such as post-coma patients who remain in a disorder of consciousness.

More information: Aurore Thibaut et al, Sham-controlled randomized multicenter trial of tDCS for prolonged disorders of consciousness,

European Journal of Neurology (2023). [DOI: 10.1111/ene.15974](https://doi.org/10.1111/ene.15974)

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