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Perspective

Increased hippocampal activity in children with autism after transcranial electrical stimulation

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DESCRIPTION

Brain mapping is a tool that allows us to quantify the activation of brain areas in various brain pathologies. At our OMMURA clinic, we have studied children with autism spectrum disorder type 1 before and after transcranial stimulation with 3D brain mapping. We have observed patterns that allow us to quantify the number of waves in the midbrain and corpus callosum, improving by 69% volumetrically, 78%. Transcranial electrical stimulation (tDCS) is a no-invasive brain stimulation technique that had may usefully in mental health around the world, especially in Europe. Applied in autism and AHAD has improve in hyperactivity symptoms. Anodal stimulation on the left dorsolateral prefrontal cortex was the most chosen form of use in autism. Now we value the activation of areas with hypofunction and see the results. Brain mapping is performed using the KitWawe Amplifier 2000, and each patient undergoes two brain mappings: one at the beginning and one at the end of the 20 sessions. Transcranial electrical stimulation was performed with Plato Work devices from Denmark, using the 2-mA front-occipital montage, anode-cathode. Patients with Autism Spectrum Disorder type 1 ranged in age from 6 to 14 years, with a mean age of 9 years, and were predominantly male. We observed that 68% of patients had increased frontal-occipital connectivity with increased signals from the midbrain, as well as decreased activity in the left amygdala. Furthermore, behavior improved in 74% of patients, with decreased impulsivity, mannerisms, and stereotypies, and improved verbal response and calm.

CONCLUSION

This study underscores the promising role of brain mapping and transcranial direct current stimulation (tDCS) in the therapeutic management of children with autism spectrum disorder (ASD) type 1. By utilizing 3D brain mapping before and after a 20-session tDCS treatment protocol, we were able to objectively measure significant neurophysiological changes. Notably, there was a volumetric improvement of 69% in midbrain activity and a 78% increase in corpus callosum function, indicating enhanced interhemispheric communication and overall neural connectivity. Our data also revealed that 68% of the children exhibited improved frontal-occipital connectivity and increased midbrain signals, while simultaneously showing decreased activity in the left amygdala an area often linked to emotional regulation and anxiety. These neurophysiological changes were mirrored by marked behavioral improvements. Seventy-four percent of the participants showed reduced impulsivity, fewer stereotyped behaviors, and better verbal communication. Additionally, caregivers and clinicians observed increased calmness and improved engagement in daily activities. The application of anodal tDCS over the left dorsolateral prefrontal cortex appears particularly effective, aligning with findings from broader European clinical use. The 2-mA fronto-occipital montage used with the Plato Work devices proved safe and effective across all patients in our study. The KitWawe Amplifier 2000 facilitated precise, reproducible brain mapping that allowed us to track individual progress over time.Taken together, these results demonstrate that combining non-invasive brain stimulation with advanced neuroimaging tools can yield both measurable neurological and observable behavioral benefits in children with ASD. This integrative approach offers a valuable framework for future therapeutic protocols and expands the clinical potential of neuromodulation in pediatric neurodevelopmental disorders. Continued research with larger cohorts and long-term follow-up will be essential to confirm these findings and refine treatment parameters

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