

# Electrical brain stimulation can alleviate swallowing disorders after stroke

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After stroke, patients often suffer from dysphagia, a swallowing disorder that results in greater healthcare costs and higher rates of complications such as dehydration, malnutrition, and pneumonia. In a new study published in the July issue of *Restorative Neurology and Neuroscience*, researchers have found that transcranial direct current stimulation (tDCS), which applies weak electrical currents to the affected area of the brain, can enhance the outcome of swallowing therapy for post-stroke dysphagia.

"Our [pilot study](#) demonstrated that ten daily sessions of tDCS over the affected esophageal [motor cortex](#) of the brain hemisphere affected by the stroke, combined with swallowing training, improved post-stroke [dysphagia](#). We observed long-lasting effects of anodal tDCS over three months," reports lead investigator Nam-Jong Paik, MD, PhD, of the Department of [Rehabilitation Medicine](#), Seoul National University College of Medicine, Seoul, South Korea.

Sixteen patients with acute post-stroke dysphagia were enrolled in the trial. They showed signs of swallowing difficulties such as reduced [tongue movements](#), coughing and choking during eating, and [vocal cord](#) palsy. Patients underwent ten 30-minute sessions of swallowing therapy and were randomly assigned to a treatment or control group. Both groups were fitted with an electrode on the scalp, on the side of the brain affected by the stroke, and in the region associated with swallowing. For the first 20 minutes of their sessions, tDCS was administered to the treatment group and then swallowing training alone continued for the

remaining 10 minutes. In the control group, the direct current was tapered down and turned off after thirty seconds. Outcomes were measured before the experiment, just after the experiment, and again three months after the experiment. A patient from each group underwent a [PET scan](#) at before and just after the treatment to view the effect of the treatment on metabolism.

All patients underwent interventions without any discomfort or fatigue. There were no significant differences in age, sex, stroke lesion site, or extent of brain damage. Evaluation just after the conclusion of the sessions found that dysphagia improved for all patients, without much difference between the two groups. However, at the three month follow-up, the treatment group showed significantly greater improvement than the control group.

In the PET study, there were significant differences in cerebral metabolism between the first PET scan and the second PET scan in the patient who had received tDCS. Increased glucose metabolism was observed in the unaffected hemisphere, although tDCS was only applied to the affected hemisphere, indicating that tDCS might activate a large area of the cortical network engaged in swallowing recovery rather than just the areas stimulated under the electrode.

"The results indicate that tDCS can enhance the outcome of swallowing therapy in post-stroke dysphagia," notes Dr. Paik. "As is always the case in exploratory research, further investigation involving a greater number of patients is needed to confirm our results. It will be important to determine the optimal intensity and duration of the treatment to maximize the long-term benefits."

Provided by IOS Press

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