

Early Brain Stimulation may Help Stroke Survivors Recover Language Function



Transcranial magnetic stimulation (TMS) The TMS device is a handheld magnetic coil that delivers low intensity stimulation and elicits muscle contractions when applied over the motor cortex. courtesy JGH audiovisual services

Non-invasive brain stimulation may help stroke survivors recover speech and language function, according to new research in the American Heart Association journal *Stroke*.

Between 20 percent to 30 percent of stroke survivors have aphasia, a disorder that affects the ability to grasp language, read, write or speak. It's most often caused by strokes that occur in areas of the brain that control speech and language.

"For decades, skilled speech and language therapy has been the only therapeutic option for stroke survivors with aphasia," said Alexander Thiel, M.D., study lead author and associate professor of neurology and neurosurgery at McGill University in Montreal, Quebec, Canada. "We are entering exciting times where we might be able in the near future to combine speech and language therapy with non-invasive brain stimulation earlier in the recovery. This could result in earlier and more efficient aphasia recovery and also have an economic impact."

In the small study, researchers treated 24 stroke survivors with several types of aphasia at the rehabilitation hospital Rehanova and the Max-Planck-Institute for neurological research in Cologne, Germany. Thirteen received transcranial magnetic stimulation (TMS) and 11 got sham stimulation.

The TMS device is a handheld magnetic coil that delivers low intensity stimulation and elicits muscle contractions when applied over the motor cortex.

During sham stimulation the coil is placed over the top of the head in the midline where there is a large venous blood vessel and not a language-related brain region. The intensity for stimulation was lower intensity so that participants still had the same sensation on the skin but no effective electrical currents were induced in the brain tissue.

Patients received 20 minutes of TMS or sham stimulation followed by 45 minutes of speech and language therapy for 10 days.

The TMS groups' improvements were on average three times greater than the non-TMS group, researchers said. They used German language aphasia tests, which are similar to those in the United States, to measure language performance of the patients.

"TMS had the biggest impact on improvement in anomia, the inability to name objects, which is one of the most debilitating aphasia symptoms," Thiel said.

Researchers, in essence, shut down the working part of the brain so that the stroke-affected side could relearn language. "This is similar to physical rehabilitation where the unaffected limb is immobilized with a splint so that the patients must use the affected limb during the therapy session," Thiel said.

"We believe brain stimulation should be most effective early, within about five weeks after stroke, because genes controlling the recovery process are active during this time window," he said.

Thiel said the result of this study opens the door to larger, multi-center trials. The NORTHSTAR study has been funded by the Canadian Institutes of Health Research and will be launched at four Canadian sites and one German site later in 2013.

The Walter and Marga Boll and Wolf-Dieter-Heiss Foundations funded the current study.

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Source: [American Heart Association](#)

Published on : Fri, 28 Jun 2013

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