Transcranial Magnetic Stimulation Found to Boost Memory

iVan Budimir September 02, 2014

Study may help Alzheimer's patients

Researchers at Northwestern University in the US have shown that electrical stimulation of the brain can improve memory, with the benefits lasting long after treatment.

(Newswire.net -- September 2, 2014) --

Failing memory is one of the (many) drawbacks of old age, but can also impact younger people suffering from stroke, early-stage Alzheimer's disease, traumatic brain injury and cardiac arrest. In a breakthrough that opens up the potential for new treatments for memory impairments in the young and old, researchers at Northwestern University in the US have shown that electrical stimulation of the brain can improve memory, with the benefits lasting long after treatment.

Northwestern Medicine researchers have discovered that using high-frequency repetitive transcranial magnetic stimulation (rTMS) to indirectly stimulate the hippocampus portion of the brain (which is involved in forming memories) improves long-term memory.

The discovery opens up interesting new possibilities for treating memory impairments caused by conditions such as stroke, early-stage Alzheimer’s disease, traumatic brain injury, and cardiac arrest — along with the memory problems that occur in aging.

Unlike Deep Brain Stimulation, in which electrodes are implanted into the brain and which has also shown promise for enhancing memory as well as for the treatment of depression, the Northwestern study involves a non-invasive method called Transcranial Magnetic Stimulation (TMS). This uses magnetic pulses to induce electrical activity in particular regions of the brain and has previously been shown to enhance the learning ability of rats and shown promise in the treatment of migraines.

“We show for the first time that you can specifically change memory functions of the brain in adults without surgery or drugs, which have not proven effective,” said senior author Joel Voss, assistant professor of medical social sciences at Northwestern University Feinberg School of Medicine. “This noninvasive stimulation improves the ability to learn new things. It has tremendous potential for treating memory disorders.”

"They remembered more face-word pairings after the stimulation than before, which means their learning ability improved," Voss said. "That didn’t happen for the placebo condition or in another control experiment with additional subjects."

The team says their study is also the first to show that the recall of events involves many different brain regions working together with the hippocampus. The MRIs showed that the TMS caused the brain regions to become more synchronized with each other and the hippocampus, with the greater the improvement in the synchronicity or connectivity, the better the subject's performance in the memory test.

"It’s like we replaced their normal conductor with Muti," said Joel Voss, referring to Riccardo Muti, the music director of the renowned Chicago Symphony Orchestra. "The brain regions played together better after the stimulation."

Although the tests were conducted on people with normal memory, in whom the researchers didn't expect to see great improvements as their brains were already working effectively, the researchers believe the effects on people with brain damage or a memory disorder would be even more evident, with even a small change translating into gains in their function.

To put this theory to the test, Voss will now study the effect of TMS on people with early-stage memory loss. However,

he cautioned that years of research would be required before it is known whether the technique is safe or effective for people with Alzheimer's disease or similar memory disorders.

The study was published August 29 in Science.

Source: http://newswire.net/newsroom/news/00084834-electrical-stimulation-of-the-brain-can-improve-memory.html