New invasive imaging technique to monitor brain function

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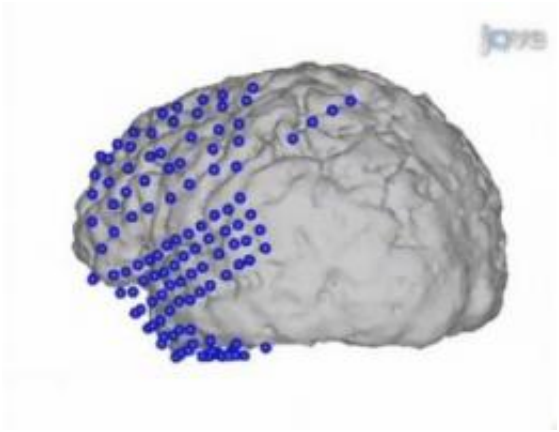

This image shows the implanted electrodes as they are mapped on the brain. Credit: *Journal of Visualized Experiments*

A new video article in *JoVE*, the *Journal of Visualized Experiments*, describes a novel procedure to monitor brain function and aid in functional mapping of patients with diseases such as epilepsy. This procedure illustrates the use of pre-placed electrodes for cortical mapping in the brains of patients who are undergoing surgery to minimize the frequency of seizures. This technique, while invasive, provides real-time analysis of brain function at a much higher resolution than current technologies.

Typically, functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) are used in neuroimaging studies but

these techniques suffer from low temporal and spatial resolution. By using electrodes implanted in the brain of an epileptic patient already undergoing treatment, scientists can now image the brain with a much higher spatial resolution, lower signal interference, and a higher temporal resolution than fMRI or EEG.

The leading author of the study, Dr. Gerwin Schalk, from the New York State Department of Health and Albany Medical College, states, "Essentially, we have created a new imaging technique. Our procedure is innovative because it is prospective, meaning, it can image brain function as it occurs. Further, it does not require an expert to derive meaningful information concerning brain function." He also notes that it was crucial for this procedure to be demonstrated in a video format. "The procedure is a very visual process. The ancillary information such as the spatial relationships of different components, the set-up of the hospital room, and the set-up of the equipment itself cannot be represented in a typical print article. The video capacities of *JoVE* were an excellent vehicle to demonstrate both the general set-up and the specific implementation of the mapping system."

By relying on an epileptic patient's neural implants, scientists gain an unprecedented insight into the brain's function. Dr. Schalk's procedure provides a technological advancement that can be applied in many ways, including stroke patient monitoring and rehabilitation, signal mapping and transduction for movement of prosthetic limbs, and enhancement of communication in individuals with paralysis of the vocal musculature. The *JoVE* video article provides a comprehensive demonstration of the new technique, from mapping the electrical implants to interpreting the tests in real time. *JoVE* editor Dr. Claire Standen emphasizes, "The new imaging technique demonstrated in this article is very important. There is a definite need for better, more accurate, imaging to monitor brain function. This technique can be applied to a wide range of clinical areas within the Neuroscience field." The article can be found here:

More information: Schalk et. al.: www.jove.com/video/3993/record … nal-cortical-mapping

Provided by The Journal of Visualized Experiments