

Researchers use improved imaging technique; discover a better approach to diagnosing epilepsy

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Using state-of-the-art, 7 Tesla magnetic resonance imaging (MRI) technology, University of Minnesota Medical School researchers may have uncovered a better approach to diagnosing epilepsy.

In the process, the team was able to cure eight patients of all epileptic symptoms.

Epilepsy, a neurological disorder causing repeated seizures or convulsions, impacts about one percent of the population, according to the National Institutes of Health (NIH). The most common type of epilepsy is [temporal lobe epilepsy](#), caused by scarring inside the hippocampus, a major memory center of the brain. Many of these patients have severe memory problems, even in between seizures.

Using 7 Tesla MRI technology, a U of M research team led by University of Minnesota Physician neurologist Dr. Thomas Henry, scanned epileptic patients to capture extremely detailed images of their brain. (The strength of a magnetic field is measured in Tesla units. The higher the field strength, the more detailed the image acquired by MRI machines.)

While most standard clinical [MRI machines](#) have strength of 1.5 or 3 Tesla, the improved 7 Tesla technology allowed researchers to make highly-improved, detailed images of patients' [brain tissue](#), especially the

portion responsible for causing epilepsy.

The clearer [MRI images](#) allowed Henry and his colleagues to more accurately find [scar tissue](#) associated with temporal lobe epilepsy. Accurately locating this scarring is critical because if medications fail to control [epileptic seizures](#), it's often possible for highly-trained neurosurgeons to remove scars from the brain in order to stop the seizures. The healthy parts of the brain left untouched, and actually begin to function better after seizures stop.

"There is huge potential here to improve patient care through improved approaches to [magnetic resonance imaging](#)," Henry said. "When you see how much clearer these 7 Tesla images are, compared with standard MRI, it's sort of like reading fine print with a magnifying glass versus the naked eye. The possibility of using 7 Tesla MRI to find brain lesions that were missed on current brain scans is likely to be very helpful in epilepsy and many other conditions."

Dr. Henry and his team conducted their research in the University of Minnesota's Center for [Magnetic Resonance](#) Research (CMRR), an interdisciplinary research laboratory that is home to the world's strongest imaging magnets and most sensitive scanners.

"Standard MRI technology is an effective way to diagnose epilepsy when it is caused by large lesions," said Henry. "We believe that by using 7 Tesla machines, which we have right at our fingertips on the University of Minnesota campus, we'll be able to treat a greater population of epileptic patients more effectively," said Henry.

Provided by University of Minnesota

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