



# The Double Storm

Could epilepsy and depression have a common cause—and cure?

BY TOM VALEO

**W**hen you hear the word “epilepsy,” what comes to mind? Hollywood usually shows us the convulsions of the grand mal seizure, but the seizures caused by temporal lobe epilepsy are more common, if less obvious.

During a temporal lobe seizure, a person can be overcome by intense emotions, vivid memories—even sensory hallucinations. And accumulating evidence suggests that people with epilepsy are prone to developing depression and other mood disorders, while people with a history of depression develop epilepsy four to seven times more often than average.

Fortunately, the seizures caused by temporal lobe epilepsy can be controlled by an array of medications, many of which also improve mood. If the medications don't work, and if the brain lesion causing the seizures can be located, it can be surgically removed, often leaving the patient both seizure- and depression-free.

## THE SEAT OF EMOTION

The temporal lobes, which ride the brain like saddlebags, each contain an almond-shaped structure called the amygdala that generates an emotional reaction to our sensory perceptions. Presented with the smell of smoke, the amygdala may generate fear, until we realize that the smoke is coming from a neighbor's grill. Then, at the thought of juicy hamburgers, the amygdala may generate excitement.

“When we see or hear something, the amygdala tells us if it's frightening or sexually arousing or whatever,” says David Bear, M.D., a neurologist in the department of psychiatry at the University of Massachusetts. “It adds the emotional



charge to our experiences. When the amygdala is removed from both hemispheres of an animal's brain, the animal doesn't show fear, it doesn't become aggressive, and it may try to mount animals of both sexes. It doesn't even do a good job of determining what's good to eat! A monkey without an amygdala may try to bite a piece of metal.”

Temporal lobe epilepsy often creates the opposite situation: the amygdala generates *too much* emotion, which can result in mood disorders.

## EPILEPSY AND PERSONALITY

What did Joan of Arc and Fyodor Dostoyevsky have in common? They both showed signs of Geschwind syndrome, a group of personality traits that seem to result from the epileptic storms that excite the temporal lobes.

The most common traits of Geschwind syndrome—excessive writing or “hypergraphia,” intense interest in religion, a clingy personality, aggression, and altered sexuality—are not inherently abnormal. What one person considers

hyperreligious behavior another might consider admirable piety. A “sticky” personality can be viewed as devotion to friends. Hypergraphia can propel a writer to literary achievement, as in the case of Dostoyevsky. Aggression can be seen as a sign of intense passion, and loss of interest in sex as high-minded celibacy.

In addition, the intensity of emotion caused by temporal lobe epilepsy can be captivating. For religious leaders such as Joan of Arc, this passion may have deepened their spiritual feelings and attracted followers.

“People with temporal lobe epilepsy are like everyone else,

only more so,” says Eve LaPlante, author of *Seized*, a fascinating look at how temporal lobe seizures have affected the lives of the famous, the infamous, and the ordinary.

## DEPRESSION AND EPILEPSY

Depression affects about 20 to 40 percent of people with temporal lobe epilepsy, compared to 3 to 7 percent in the general population. This depression often yields to the antidepressants known as selective serotonin reuptake inhibitors (SSRIs), which are the first choice of treatment. Anti-epileptic drugs can help too.

The dance between epilepsy and depression is complex: People with epilepsy often can't drive or hold a job, problems that can interfere with their quality of life and lead to depression. Still, the interplay suggests that a common underlying problem promotes both conditions. Magnetic resonance imaging (MRI) often shows that the hippocampus in the temporal lobe of a depressed person shrinks, along with areas farther forward in the brain. These changes are common in people with temporal lobe epilepsy as well.

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can help  
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depression.

“You see the same changes in people with primary mood disorders *without* temporal lobe epilepsy as you see in people with temporal lobe epilepsy,” says Andres M. Kanner, M.D., director of the electroencephalography (EEG) lab at the Rush Epilepsy Center in Chicago.

This means that some medications work for both. “Antiepileptics such as lamotrigine (Lamictal) and valproic acid (Depakote, Depakene) are also used to treat bipolar disorder in people without epilepsy,” says Brien Smith, M.D., medical director of the Comprehensive Epilepsy Program at Henry Ford Hospital in Detroit.

One link between temporal lobe epilepsy and mood disorders is the neurotransmitter serotonin. Seizures can be induced in animals by sending electricity into their brain; subsequent seizures then become much easier to induce due to a process known as “kindling.” But if these animals receive antidepressants that boost their level of serotonin, the kindling stops, and seizures become much more difficult to induce.

“This suggests there’s a serotonin dysfunction in both temporal lobe epilepsy and in mood disorders,” says Kanner.

#### FINDING THE BEST TREATMENT

Dilantin and phenobarbital, the first medications approved for temporal lobe epilepsy, stopped generalized seizures, but still permitted the localized discharges that make the amygdala susceptible to Geschwind syndrome.

Newer drugs such as lamotrigine, topiramate (Topamax), and felbamate (Felbatol) appear to do a better job at quelling electrical activity in the temporal lobes. These drugs also stabilize mood.

If antidepressants and anti-epileptic drugs fail to control the seizures, mood disorders, and personality changes associated with temporal lobe epilepsy, doctors can surgically remove an entire

temporal lobe or implant a device known as a vagus nerve stimulator (VNS) into a patient’s chest that sends

electrical signals to the brain along the vagus nerve in the left side of the neck. This periodic electrical stimulation reduces seizures and depression, possibly by affecting blood flow to the brain and boosting levels of serotonin. But while surgery at any point can reduce seizures and lift depression, the personality traits influenced by temporal lobe epilepsy can become ingrained after years of seizures and remain unaffected by the removal of the amygdala.

“Many studies show successful epilepsy surgery improves depression,” says

Frank Gilliam, M.D., director of the Comprehensive Epilepsy Center at Columbia University Medical Center in New York. “Whether that’s

due to an improvement in the quality of life or to removing abnormal tissue and stopping seizures isn’t exactly clear.”

“We have a long way to go to fully understand the best way to treat depression in epilepsy,” says Gilliam. “However, I’m optimistic that available therapies for depression used in the right combination with those for epilepsy will allow most patients to be satisfactorily treated.” NN

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