

## Veterans can have seizures decades after a head injury, study finds

*It's unclear what can trigger the post-traumatic epilepsy, which can hit up to 35 years after a penetrating head wound. The long-term study looks at Vietnam veterans.*

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Soldiers who suffered brain injuries can develop seizures decades — as long as 35 years — after the initial injury, researchers have found.

A study published Tuesday in the journal *Neurology* found that among a group of 199 Vietnam veterans, about 13% developed post-traumatic epilepsy more than 14 years after they had suffered a penetrating head wound, such as a gunshot injury or shrapnel that entered brain tissue. Penetrating head injuries are generally linked with a higher risk for epilepsy than other types of head injuries, such as concussions.

Among the veterans, who are part of a long-term investigation called the Vietnam Head Injury Study, the overall rate of post-traumatic epilepsy was about 44%, consistent with similar military groups.

It is unclear what's responsible for the triggering of seizures so many years after a penetrating head injury, said study coauthor Jordan Grafman, chief of the Cognitive Neuroscience Section of the National Institute of Neurological Disorders and Stroke in Bethesda, Md.

"There are all sorts of things that can contribute to a [late-onset] seizure, including sleep deprivation, excessive drinking and other kinds of illnesses," Grafman said.

The study showed that soldiers who retained pieces of metal in their brains were at heightened risk for seizures, as were those with larger brain lesions (these also predicted a higher frequency of seizures).

The researchers also looked to see if there was a link between seizure risk and a gene known to be involved in neuronal plasticity (the ease with which brain cells can change or repair their patterns of connections), but found no association. Still, Grafman hasn't ruled out a genetic component: "We all recover from brain injuries differently, and we may find that in some cases those differences are genetic."

The study also found that some vets who had developed post-traumatic epilepsy experienced worsening of seizures over the years. In the most recent year that the study participants reported their seizures, a quarter had simple partial seizures — during which people stay alert and can recall what happened — that had progressed into generalized seizures, which can trigger a loss of consciousness.

The seizures occurred despite the fact that more than 88% of those with post-traumatic epilepsy were on anticonvulsant medication.

Cognitive decline later in life was also seen among some of the veterans with seizure disorders. This was assessed by comparing past scores on the Armed Forces Qualification Test (which is given to potential soldiers to measure mental ability) to more recent ones.

"You can have an injury and get better, but with time, people don't always do as well as they should," said Dr. Gerald Grant, associate professor of neurosurgery at Duke University in Durham, N.C., and a former Air Force neurosurgeon. "It shows us that this is a chronic disease."

It is unclear how the study relates to combatants returning from Iraq and Afghanistan today, the authors said. The Vietnam veterans in the study suffered from penetrating brain injuries, which are rarer in soldiers fighting in the current conflicts because helmets have improved. Today, closed-head injuries (where the brain is not penetrated) are more common, in part because of the helmet improvements and partly because of a change in the weaponry used in modern warfare.

Nonetheless, Grafman said, the study underscores the importance of long-term follow-up for military civilians who have suffered traumatic brain injuries.