

# Mini-strokes leave 'hidden' brain damage: research

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Each year, approximately 150,000 Canadians have a transient ischemic attack (TIA), sometimes known as a mini-stroke. New research published today in *Stroke*, the journal of the American Heart Association shows these attacks may not be transient at all. They in fact create lasting damage to the brain.

The stroke research team, led by Dr. Lara Boyd, physical therapist and neuroscientist with the Brain Research Centre at Vancouver Coastal Health and the University of British Columbia, studied 13 patients from the Stroke Prevention Clinic at Vancouver General Hospital and compared them against 13 healthy study participants. The TIA subjects had all experienced an acute episode affecting motor systems, but had symptoms resolved within 24 hours. The patients were studied within 14-30 days of their episode, and showed no impairment through clinical evaluation or standard imaging (CT or MRI). Participants then underwent a unique [brain mapping](#) procedure using transcranial [magnetic stimulation](#) (TMS) with profound results.

"What we found has never been seen before," says Dr. Boyd, who also holds the Canada Research Chair in Neurobiology of Motor Learning at UBC. "The brain mapping capabilities of the TMS showed us that TIA is actually causing damage to the brain that lasts much longer than we previously thought it did. In fact, we are not sure if the brain ever recovers."

In the TIA group, [brain cells](#) on the affected side of the brain showed

changes in their excitability – making it harder for both excitatory and inhibitory neurons to respond as compared to the undamaged side and to a group of people with healthy brains. These changes are very concerning to the researchers as they show that TIA is likely not a transient event.

A [transient ischemic attack](#) is characterized as a brief episode of blood loss to the brain, creating symptoms such as numbness or tingling, temporary loss of vision, difficulty speaking, or weakness on one side of the body. Symptoms usually resolve quickly and many people do not take such an episode seriously. However, TIAs are often warning signs of a future stroke. The risk of a stroke increases dramatically in the days after an attack, and the TIA may offer an opportunity to find a cause or minimize the risk to prevent the permanent neurologic damage that results because of a stroke.

"These findings are very important," says Dr. Philip Teal, head of the Stroke Prevention Clinic at VGH and co-author of the study. "We know that TIA is a warning sign of future stroke. We treat every TIA as though it will result in a stroke, but not every person goes on to have a stroke. By refining this brain mapping technique, our hope is to identify who is most at risk, and direct treatment more appropriately."

The use of transcranial magnetic stimulation in examining the patterns of brain activation as they relate to motor learning after [stroke](#) has been a main focus of Dr. Boyd and her research lab.

The research team has recently received a Canadian Institutes for Health Research grant to continue their research in this area. "We know now that people may look and feel fine, and even standard imaging says they are fine, but they are not," says Jodi Edwards, PhD candidate in the School of Population and Public Health, UBC, lead author of the study, and member of Dr. Boyd's lab. "We want to know if the damage persists,

if we can identify who is most at risk, and how we can most effectively target the damaged area for optimum treatment. We are extremely excited to continue to follow this work."

Provided by University of British Columbia

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