

Smart brain-wave cap recognizes stroke before the patient reaches the hospital

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A special brain-wave cap can diagnose stroke in the ambulance, allowing the patient to receive appropriate treatment faster. Jonathan Coutinho, neurologist at Amsterdam UMC, is one of the inventors the swimming

cap and says, "Our research shows that the brain-wave cap can recognize patients with large ischemic stroke with great accuracy. This is very good news, because the cap can ultimately save lives by routing these patients directly to the right hospital." The research is published in *Neurology*.

Every year, millions of people worldwide suffer an ischemic [stroke](#), the most common type of stroke. An ischemic stroke occurs when a [blood clot](#) blocks a blood vessel of the [brain](#), causing a part of the brain to receive no or insufficient blood. Prompt treatment is crucial to prevent permanent disability or death.

Neurologist Jonathan Coutinho, Technical Physician Wouter Potters and professor of Radiology Henk Marquering, all from Amsterdam UMC, invented the brain-wave cap, which allows an EEG (brain wave test) to be carried out in the ambulance.

This brain wave test shows whether there is an ischemic stroke and whether the blocked cerebral blood vessel is large or small. This distinction determines the treatment: in case of a small ischemic stroke, the patient receives a blood thinner, and in case of a large ischemic stroke, the blood clot must be removed mechanically in a specialized hospital.

"When it comes to stroke, time is literally brain. The sooner we start the right treatment, the better the outcome. If the diagnosis is already clear in the ambulance, the patient can be routed directly to the right hospital, which saves valuable time," says Coutinho.

Between 2018 and 2022, the smart brain-wave cap was tested in twelve Dutch ambulances, with data collected from almost 400 patients. The study shows that the brain-wave cap can recognize patients with a large ischemic stroke with great accuracy. "This study shows that the brain-

wave cap performs well in an ambulance setting. For example, with the measurements of the cap, we can distinguish between a large or small ischemic stroke," adds Coutinho.

In order to develop the brain-wave cap into a product and bring it to the market, TrianecT, an Amsterdam UMC, spin-off company was founded in 2022. In addition, a follow-up study (AI-STROKE) is currently ongoing in which even more measurements are collected in order to develop an algorithm for improved recognition of a large [ischemic stroke](#) in the [ambulance](#).

More information: Prehospital Detection of Large Vessel Occlusion Stroke With Electroencephalography: Results of the ELECTRA-STROKE Study, *Neurology* (2023).
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