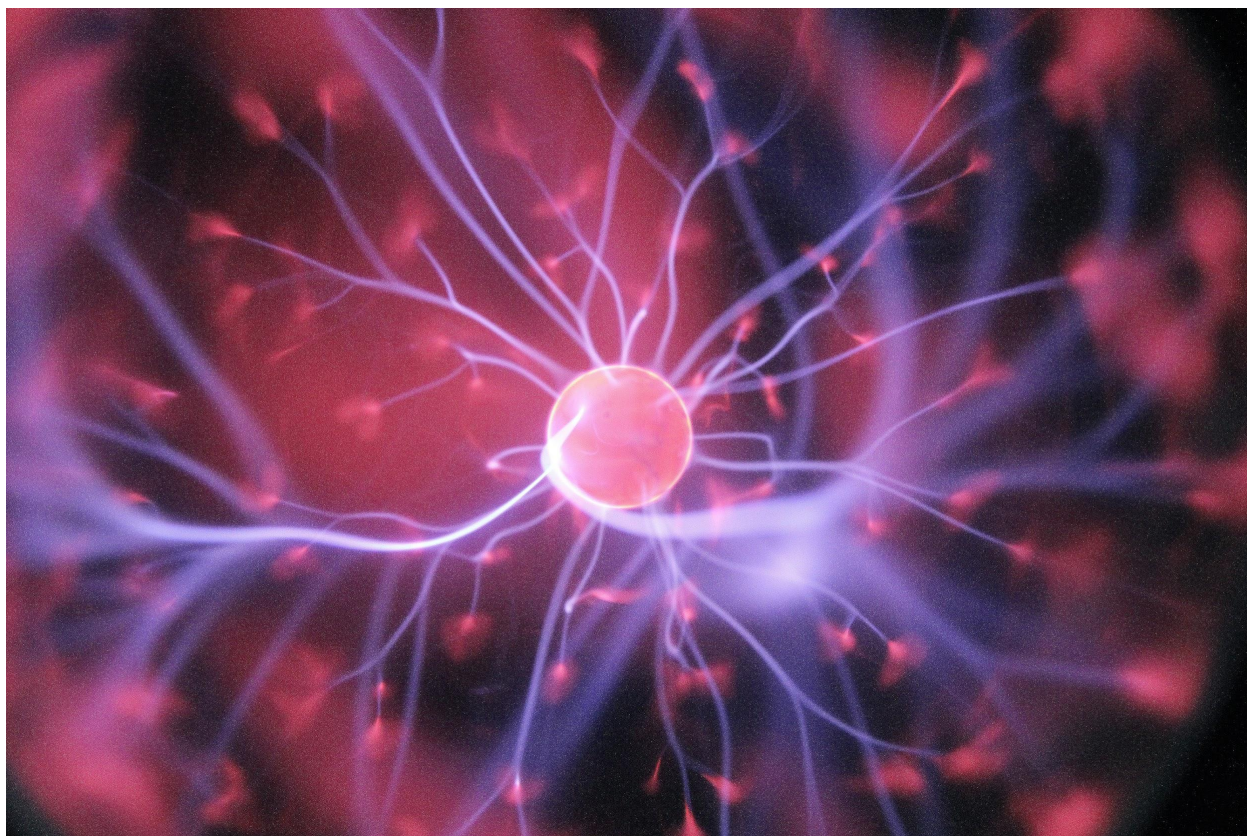


Loop: Stopping Seizures with Soundwaves and a Sniffer

The Problem

Our life experiences are limited entirely by our cognitive capacity. Without worldwide access to state-of-the-art medical technology, millions of lives everywhere are hindered by brain disorders or factors like anxiety, stress, and a lack of focus. By pairing the mind with technology, non-invasively — and affordably — we can work towards solving these issues and improving the experience of life.

This, in essence, is the mission of Loop. We connect the brain with technology. And we're starting with epilepsy.



Epilepsy is a chronic disorder that causes unpredictable and uncontrollable seizures.

Our brains are composed of neurons that communicate through electrical impulses. If several neurons in a certain part of the brain fire out of nowhere, the false signal is sent to neighboring

cells, causing a section of the brain to go haywire, and a part of the person's body or their consciousness to go berserk.

It is easy to see how all this can impair daily activities.

According to the World Health Organization,

Around 50 million people worldwide have epilepsy, making it one of the most common neurological diseases globally. Nearly 80% of people with epilepsy live in low- and middle-income countries [...] People with epilepsy can experience reduced access to educational opportunities, a withholding of the opportunity to obtain a driving licence, barriers to enter particular occupations, and reduced access to health and life insurance. In many countries legislation reflects centuries of misunderstanding about epilepsy, for example, laws which permit the annulment of a marriage on the grounds of epilepsy and laws that deny people with seizures access to restaurants, theatres, recreational centres and other public buildings.

We interviewed a student who suffered from childhood epilepsy, and the problems outlined above suddenly became very real.

Having a seizure is scary. It's a little like blacking out for a hot minute. You just kinda forget what you were talking about... afterwards its like a hole in your memory... I had to stop swimming for a while... I can't watch many movies because the flashing lights are triggering.

The epilepsy experience is also different for everyone. The basic nature of the disorder is the same - but the specific parts of the brain it impacts affects how it is expressed. For example, one person's seizures may cause them to lose consciousness; another might hallucinate; and a third may go into angry hysterics.



The only options for most epileptic patients are anti-seizure medication and brain surgery.

According to [epilepsy.com](https://www.epilepsy.com), a patient usually has to be taking two to three different medications at once in order to raise the likelihood of actually stopping a seizure to over 50%. Moreover, they aren't customizable. Medicine that ends seizures for someone likely will have no effect on another person. An estimated 40% of epileptics are not helped by anti-seizure medication at all.

And brain surgery is a pain in many ways - in some cases entire hemispheres must be removed.

The worst part is that, along with low success rates, both of these options are exorbitantly [expensive](#). Medication costs between \$50 and \$1,000+ for just sixty tablets — tablets that need to be taken daily, usually for a patient's lifetime. Not to mention, most epileptics worldwide don't have access to these to begin with.

The Solution: Soundwaves and a Sniffer

This is where Loop comes in. Our first product is a completely non-invasive system that detects and suppresses seizures in real time.



Dogs can be trained to detect seizures up to an hour in advance by using their sense of smell. This means that some “sniffable” compound (known as a pheromone biomarker) is produced by the body before a seizure begins — we just can’t detect it with our own noses.

However, studies have been able to pinpoint that the biomarker is a [compound](#) found within human sweat, possibly menthone, and is produced as a form of the body’s stress signal in response to an oncoming seizure (in a way the patient can’t consciously recognize).

The Loop device consists partly of an armband that, when detecting a biomarker, vibrates to alert the user of an oncoming seizure.

Loop’s seizure-sniffing armband

Being able to detect seizures and warn patients about them is wonderful — but it isn’t enough.

Recent studies (such as a [project at Stanford University](#)) have shown that high-intensity focused ultrasound (directed at the problematic area of the brain as a seizure begins) can dissipate seizures before they have the opportunity to spread. Continuous stimulation at 750 to 800 kHz

for around 20 minutes can successfully suppress the abnormal activity within problematic regions of the brain.

So far, experiments proving this have only been done in the lab, with bulky ultrasound machinery. At Loop, we are working towards a small, handheld ultrasound device designed specifically to deliver pulses at the most effective range for a patient.

Loop's handheld ultrasound device is placed against the head, angled towards the seizure focal point. It emits high-intensity soundwaves that stop seizures without damaging brain cells.

The best part about Loop is that it decreases seizure treatment costs for patients by over tenfold and increases success rates by over 50%. Not to mention, all components are customizable. We recognize that each patient will have a different seizure experience, and our device is flexible enough to where the user can direct it specifically to the spot where abnormal brain activity begins.

Unlike other existing solutions, Loop is also completely kid-friendly. Our technology allows for different sizes and extra attachments such as handles, straps, and cases that make it easier for parents to take care of their children easily and risk-free. The set also includes different skin designs so kids can customize their devices.

The Future

Epilepsy is just one of many cognitive problems facing the world today. The reality is that, like, seizure-disorders, many mental disorders are overlooked, seen as unimportant, surrounded by misconceptions, and affect more people than we truly realize.

Other disorders that Loop can help with in the future include Parkinson's disease, psychosis, and asthma.

The technology that Loop aims to employ is safe and versatile. We are beginning by ending unpredictable seizures — but we won't stop there.

"I think it's cool that we're pairing technology with healthcare like this... I can see how so many kids and adults can benefit from this kind of thing. They can be human without worrying about their seizures!"

— Student with epilepsy