

CALM IN YOUR PALM

Biofeedback device promises to reduce stress

BY SAMUEL K. MOORE

TOOLS & TOYS

Standing in front of a room of over a hundred software developers at the height of the dot-com boom, Michael Wood suffered a paralyzing panic attack. Wood had reached the end of his tether after months of grinding work and regular commutes between New York City and London. He quit his job and devoted himself to understanding—and beating—stress.

The result is a sleek, solid, handheld biofeedback device called the StressEraser, built by New York City–based Helicor Inc., which Wood founded with his business partner, Adam Forbes. Essentially, the StressEraser is an aid for deep breathing exercises, which are commonly prescribed to alleviate stress. The device tells you just when to inhale and when to stop. It does this by divining the state of your nervous system by some clever analysis of your heart rate—and thus indicating when you should take those deep, relaxing breaths.

Basically, the device is a pulse oximeter integrated with a display and a microprocessor. Pulse oximeters identify heartbeats by the variation in the amount of light absorbed through the skin of your finger as fresh blood pulses through it. The StressEraser monitors your heart rate to identify the activity level of the vagus nerve, one of 12 nerves that emanate directly from your brain rather than through your spinal cord. The vagus nerve connects with your heart, lungs, stomach, and all the other organs in your gut. It carries a variety of mellowing signals from the brain, such as the one that tells your stomach to slacken when you start eating and your heart to slow down when it's time to relax. [For the vagus nerve's role in depression, see "Psychiatry's Shocking New Tools," in this issue.]

The relaxation signal is the one the StressEraser is programmed to measure. Under the influence of vagus nerve activity, your heart rate is almost always either accelerating or decelerating. Medical researchers have known for decades that you can deduce what's going on with the vagus nerve by following these heart-rate vari-

ations. Roughly, when the time between two heartbeats doubles, the amount of vagus nerve activity doubles, too. Wood and Forbes built on this observation by working out, over four years, algorithms that can predict when the nerve activity is about to peak and detect the start and end points of a wave of activity.

The StressEraser uses all this information to help you relax. You're relaxed when vagus nerve activity is gently rising and falling. Breathing exercises can produce this state, and they're most effective when



SIT BACK AND RELAX: The StressEraser provides visual and audible cues to help you time your breathing and so reduce your stress level.

your breathing is synchronized with your vagus nerve activity. The StressEraser tracks this activity and gives you an audible and visual cue just ahead of the nerve's peak activity by plotting tiny changes in your heart rate as a line moving across the device's screen [see photo, "Sit Back and Relax"]. At the cue, you exhale, counting in your head to a prespecified number, then you inhale until the next cue as shown by the plot. The counting gives you something to focus on, rather than letting your mind wander to bothersome thoughts, and you can adjust the number you count up to, based on what's most comfortable for you. What you're trying to achieve is large, smooth sinusoidal changes in your heart rate. The StressEraser rates your sinusoid on a scale of one

to three, with one being the roughest and three being the smoothest. Unlike other biofeedback products, the device will give you a low score if your relaxation is interrupted by emotionally charged thoughts, which show up as a jaggedness in the heart-rate waveform. This feedback teaches you to let go of those thoughts.

In all fairness, I'm a tough nut for this kind of product to crack. First, I find it difficult to stick to any kind of routine that involves self-indulgence. I can't get to the gym regularly or reliably remember to pack a lunch. So managing to use the device three times a day for a whole week, as recommended, was out of my reach. Luckily, guilt is an excellent motivator. It happened to run into Helicor's Forbes at least three times while I was reviewing the device. Each of those encounters led to a renewed dedication to spend time staring at my heart-rate waveform.

My second problem is that I'm one of the more mellow people I know. So I couldn't very well expect a revolutionary decrease in my stress level. That said, the device did relax me in every environment I tried it in. A usually tension-inducing subway ride home was almost refreshing. I nearly fell asleep in my office during one afternoon session. And my ability to concentrate while working amid the clutter of home seemed a bit improved following 5 minutes of technology-assisted breathing.

The StressEraser is easy to use and well designed, having a slim stainless steel exterior that lends

the device a bit of gravitas. My only quibble is that I would have preferred a button marked "menu" that would allow you to adjust all the device's key settings, such as whether or not the cue is audible. Instead, setting adjustments are distributed among the three buttons on the device.

At a price of \$399, the StressEraser is primarily intended to be prescribed by physicians, but anyone can buy one. Helicor certainly means it to be taken seriously as a medical device and is manufacturing it under U.S. Food and Drug Administration guidelines and participating in clinical trials. Two of those trials, for the device's use in insomnia and in general anxiety, should be complete a few months from now. Soon, stressed folks all over could be breathing easier. ■