

# Device connected to tongue designed to help blind perceive images

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An experimental device that uses the tongue instead of the eyes to "see" could be on the market next year, and a blind Fresno, Calif., teen hopes to be among the first to take one home.

Researchers say their BrainPort device does not replace the sense of sight, but lets the blind perceive images, making it easier for them to navigate their surroundings.

One group they foresee benefiting: Troops returning from Iraq and Afghanistan who are blind because of brain injuries.

BrainPort consists of a tiny digital camera mounted on sunglasses. The camera is attached by a wire to a unit about the size of an [iPhone](#), and the unit connects to a small [electrode](#) panel that sits on the tongue. The tongue receives electrical pulses -- like popping champagne bubbles.

The sensations on the tongue create patterns that users learn to perceive as images. The strongest [electrical pulses](#) are perceived as white areas and the weaker ones as gray. There is no [sensation](#) for black areas. The user has the ability to zoom the device to amplify images.

The blind process the tactile information in the brain's [visual cortex](#), researchers say. Those who could see before they went blind describe the sensations as similar to vision -- although the resolution is not the same, they say. Those who have never had sight say they are better able to form mental pictures of objects.

Katie Schick, a 17-year-old high school junior, can't wait to try it. She began losing her sight shortly after birth and lost all vision within a couple of years.

"I could possibly go on the Internet with it," she said. "I'd like to be able to go on the computer by myself at home without my mother and father with me."

Katie's parents, Andy and Jackie Schick, would be happy if Katie could maneuver around a room with ease and get safely across a street. The device "will allow her to be more independent," Jackie Schick said.

They have not had Katie evaluated by a doctor for the device, and they don't know if it would work for her. But they're hopeful.

Jackie Schick, 43, first heard about the device when it was described in a Discovery Channel television program. She investigated it on the Internet and was so excited about getting one for Katie that she contacted a company in Canada she thought sold the device. She began making plans to raise money to pay for a trip to Canada.

More recently, she learned the device being sold in Canada is an aid for people with dizziness, not blindness. The family is postponing fund-raising until the device is available for sale in the United States.

Wicab Inc., the Wisconsin company that is developing BrainPort, could ask the federal government for permission to market BrainPort within the next few weeks, said Robert Beckham, the chief executive officer.

BrainPort researchers say the idea behind the technology is fairly simple. People "see" with their brains -- not their eyes. And the brain can make visual sense out of stimulation received from parts of the body other than the eye.

"Instead of the main nerve from the eye, we're using the nervous system through the tongue," Beckham said.

The brain is pliable, he said. "It doesn't say we can't use the information because it came from the [tongue](#)."

Researchers say results from investigations of the device have been promising for people blind since birth, as well as for those who lost vision later in life.

After 10 hours wearing BrainPort, people have been able to find and walk down a hallway and avoid obstacles, said Aimee Arnoldussen, a neuroscientist who is leading Wicab's research. With the device, people also have distinguished a men's room sign from a women's room sign and found doorways, she said.

The potential for the device to help blind soldiers returning from the wars in Iraq and Afghanistan intrigued Gale Pollock, who was surgeon general of the Army medical department in 2007.

She enlisted the help of an Army officer and a Marine corporal to assess the device before she retired. Pollock said the servicemen's response was: "Ma'am, this works. It's new. We don't think it's as far as it can go, but can you get it for us?"

Pollock, now retired from the military, is executive director of the Louis J. Fox Center for Vision Restoration in Pittsburgh, Pa., where BrainPort research is ongoing. One line of the research is limited to active-duty military and veterans.

BrainPort was invented by the late Paul Bach-y-Rita, a Wisconsin neuroscientist, who conceived of the technology in the 1960s and founded Wicab in 1998, said Wicab CEO Beckham.

The National Eye Institute, a part of the National Institutes of Health, has provided funding for BrainPort research for years, said Dr. Michael Oberdorfer, director of the agency's visual neuroscience program. "It's an interesting and promising area of research," he said.

The company is still in the early stages of developing the device, Beckham said. In the next few years it's possible the device could be wireless, for example, and the receiving electrodes could be discreetly mounted on the upper palate, he said.

BrainPort can't restore vision for people who have lost it. Katie, for example, has had both eyes removed to alleviate pain. She wears artificial eyes.

"You don't put the device on and magically see," Arnoldussen said. And BrainPort isn't a substitute for a cane or a guide dog -- it's another tool to help someone know their surroundings and safely navigate them, she said.

But while researchers focus on safety and mobility applications for the device, already some BrainPort test subjects have pushed the boundaries. One man climbed an indoor rock wall wearing the device, Arnoldussen said. Another shot a ball into a wastepaper basket.

Katie Schick has her own aspirations.

"I want to be able to ride a bike and play basketball -- maybe some baseball," she said.

Riding a bike hasn't yet been tried, to her knowledge, Arnoldussen said. But the researcher doesn't discount the possibility -- especially for Katie. "I think children like the 17-year-old are probably going to surpass our expectations," she said.

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