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Singing therapy helps stroke patients regain language

By Elizabeth Landau, CNN
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STORY HIGHLIGHTS

About 200,000 U.S. strokes annually result in language disorder

Scientists use basic connection of singing and language to help restore speech

That some with brain damage can sing but not speak has long been known

Music experience also has positive impact on healthy individuals' verbal abilities

San Diego, California (CNN) -- When mothers speak to children, it's often in a singsong tone. That's no coincidence, scientists say, given that music and language are so intricately linked in the brain.

Scientists are using this fundamental connection between song and speech to treat patients who have lost their ability to communicate. There's evidence that music can be used to help people with severe brain impairments learn how to speak again, scientists said over the weekend at the annual meeting of the American Association for the Advancement of Science.

Doctors at Beth Israel Deaconess Medical Center in Boston, Massachusetts, are treating stroke patients who have little or no spontaneous speech by associating melodies with words and phrases.

"Music, and music-making, is really a very special form of a tool or an intervention that can be used to treat neurological disorders, said Dr. Gottfried Schlaug, associate professor of neurology at Beth Israel and Harvard University. "There's rarely any other activity that could really activate or engage this many regions of the brain that is experienced as being a joyous activity."

There are between 750,000 and 800,000 strokes per year in the United States, and about 200,000 of them result in a kind of language disorder called aphasia, he said. About one-third of those patients have aphasia so severe that they become non-fluent, meaning about 60,000 to 70,000 patients per year could benefit from the music therapy.

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It is being scientifically explored only at Beth Israel, but there are speech therapists throughout the United States who are using some kind of music treatment. About 25 to 30 patients have been described in published research papers, but there may be hundreds or thousands of others treated in nonscientific settings, Schlaug said.

The left side of the brain plays a key role in speech and language ability. But the right side of the brain has the capability to become enhanced and change its structure to compensate for left-side deficits, researchers have found.

Schlaug's group's technique, Melodic Intonation Therapy, involves singing tones with the patient and having the patient repeat words and phrases to the sound of those tones. Melody and rhythm are incorporated in getting the patients, who would otherwise not be able to speak, to sing.

The observation that some patients with brain damage can sing but not speak has been around for at least a century, Schlaug said. However, it's only recently that the phenomenon, and how it works in the brain, has been scientifically studied.

Anyone can be trained to do this therapy, including nonprofessional caregivers and family members, he said. It is not widespread, perhaps because of people's natural inhibition about singing with patients, he said.

"We're talking about people 50 to 90 years of age, and to change the brain at that age requires something that has to be done very intensely," he said.

Each session is 1½ hours, and the program lasts 14 to 16 weeks. For most of these kinds of therapies, in order to assess the efficacy, treatment needs to take place after the natural recovery phase, which can be six to 12 months, he said.

One example is a patient called J.M., 57 years old, who had a large lesion on the left side of his brain. He had four years of speech therapy before the intervention but could mainly utter only senseless sounds. After 75 sessions of the singing technique, he could fluently say his address when asked. Another patient was taught to say, "I am thirsty."

"If they can express their really basic needs, that is very important to someone who is otherwise nonverbal," Schlaug said.

During these 75 sessions, patients are taught several hundred words and phrases, and they will usually not lose the ability to say these things after the therapy stops. At least two-thirds of the patients are able to transfer the skills to words and phrases on which they have not been trained, he said.

One or two of Schlaug's patients have even given a small speech in public, he said.

Schlaug's group and others are also looking at music therapies for children with autism.

Neuroimaging of healthy brains has shown that the areas and signals of the brain used to process instrumental music are activated when processing spoken language, said Aniruddh Patel, senior fellow at the Neuroscience Institute.

"Your knowledge of nouns or verbs is different from your knowledge of tones and chords and harmony," he said. Yet "some of the parts of the brain we use to put the pieces together as we understand language and music seem to overlap, and that has implications for studying language disorders."

Music experience also has a positive impact on healthy individuals' verbal abilities, studies show. Nina Kraus, director of the Northwestern University's Auditory Neuroscience Laboratory, and colleagues found that, in noisy environments, musicians could hear speech better than non-musicians.

There is even speculation that music came before talk: Charles Darwin wrote that singing evolved before speech in humans, he said. Like birds, singing may have functioned in mating calls, the theory goes. Some scientists agree; others think music is just an invention, he said.

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