Hearing Test Can Assess HIV's Impact on the Brain

Based on brain waves, this test could also provide insight into the effects on the brain of concussions, Alzheimer's disease and Zika virus.

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A test that looks at brain waves to assess how well the brain is processing sound can shed light on HIV's effects on the organ.

HIV, even when well treated, impacts the central nervous system, which includes the brain.

The study of the new test, which was published in Clinical Neurophysiology, was conducted as a joint effort between Dartmouth University's Geisel School of Medicine and the Auditory Neuroscience Laboratory at Northwestern University.

The investigators relied on a test known as a speech-evoked frequency-following response (FFR). The test records brain waves through electrodes placed on the scalp while headphones play sounds that are common in everyday speech, such as "ba," "da" and "ga."

"There are many acoustic ingredients in speech, such as pitch, timing, harmonics and phrase," Nina Kraus, PhD, a neurobiologist at Northwestern, who co-led the study, said in a press release. "The FFR enables us to play speech sounds into the ear of study participants and figure out how good a job the brain is doing processing these different acoustic ingredients."

The study enrolled 68 adults living with HIV and 59 who did not have the virus.

Among those who had HIV, there was evidence of disruption in their brain's response to certain speech cues. This finding held even though these participants performed normally on a standard hearing test. This discrepancy indicated that the hearing difficulties that the FFR detected were grounded in the central nervous system.

"When the brain processes sound, it's not like a volume knob where all of the acoustic ingredients are either processed well or poorly," Kraus continued. "With the FFR, we're able to see which aspects of auditory processing are affected or diminished and ask, 'Is there a specific neural signature that aligns itself with HIV?'"

Kraus and her colleagues hope that the FFR can aid in assessing not only HIV's effects on the brain but also the effects of concussions, Alzheimer's disease and Zika virus.

To read a press release about the study, click here.

To read the study abstract, click here.

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