

# New study may lead to changes in treatment of ALS patients

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A Penn State study brings researchers one step closer to better understanding and treating dysarthria, a type of speech disorder, in people with ALS.

Dysarthria, a motor [speech](#) disorder, can cause slurred speech, slowed speech, abnormal pitch and rhythm, changes in voice quality and limited [tongue](#), lip or jaw [movement](#), according to the American Speech-Language-Hearing Association. The condition is commonly diagnosed in people with ALS.

The study indicates that the nature of tongue and jaw movement difficulty in individuals with moderate and severe dysarthria due to ALS is qualitatively different from that in individuals with mild dysarthria, according to Jimin Lee, lead investigator and assistant professor of communication sciences and disorders at Penn State. Previously, it was presumed that the amount of tongue and jaw movement would decrease linearly with severity; this study provides the first evidence of nonlinear changes.

"Previously, researchers believed that the amount of articulator movement simply becomes reduced, and that is why speakers with severe dysarthria cannot produce intelligible speech," Lee said. "This is not really what is happening, based on this study. Instead, movement reduces to a certain point, then increases again with a very different pattern. Because traditional intervention was developed with the previous view, it needs to be tested to see if it really works in people with more

severe dysarthria."

According to the finding, the expectation for impairment in individuals with severe dysarthria should be different than that for an individual with a milder case. Thus, it is likely that effective treatments would be different as well.

"Depending on the severity, people with ALS present with different types of articulator movement patterns," Lee said. "Therefore, the speech intervention for people with dysarthria secondary to ALS needs to be designed differently depending on the severity."

Researchers conducted the study using an instrument to analyze patients' speech disorders, which measures the movement of tongue, lips, and jaw using an electromagnetic field while simultaneously recording acoustic signals. The instrument is a 3-D, portable electromagnetic articulograph—also called the Wave system.

Sensors are attached to a patient's tongue to trace its movement during speech production. Patients are asked to read a specific set of words and sentences. The tool is also connected to a microphone and computer, which stores the data.

Lee collects tongue movement data from patients and people who do not have [speech disorders](#) for comparison. Additionally, Lee plays audio recordings of patients' speech for third-party listeners who rate patients' speech intelligibility.

"The ultimate goal is to identify what types of movement will generate speech signals that are easier to understand in order to help [people](#) with ALS use their speech as long as possible," Lee said. "In patients with ALS, for example, 95 percent lose their speech. We are trying to find a way to enhance their speech intelligibility by looking at tongue and jaw

movement characteristics."

**More information:** Jimin Lee et al. Articulatory Kinematic Characteristics Across the Dysarthria Severity Spectrum in Individuals With Amyotrophic Lateral Sclerosis, *American Journal of Speech-Language Pathology* (2017). [DOI: 10.1044/2017\\_AJSLP-16-0230](https://doi.org/10.1044/2017_AJSLP-16-0230)

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