

Movement direction-specific articulatory dysfunction in individuals with dysarthria secondary to ALS

Jimin Lee, Ph.D.

Department of Communication Sciences and Disorders
The Pennsylvania State University

The current study tests direction-specific articulatory dysfunction of the tongue and jaw in individuals with dysarthria secondary to ALS. It is well documented that tongue movement is more reduced and jaw movement is more exaggerated in individuals with ALS compared to typical speakers. However, it remains unknown if these articulatory dysfunctions are observed uniformly across the movement direction types (retraction, protrusion, lowering, and raising). This information is critical to understand speech production errors observed in individuals with ALS, such as vowel errors in the high-low dimension. Twenty-two individuals with ALS and 22 typically aging speakers participated in the current study. They were grouped based on speaking rate (above or below 110 wpm) and presence of ALS. Tongue and jaw movement distance in each direction was collected using electromagnetic articulography while producing the word "Iowa." The results showed that individuals with severe dysarthria presented with reduced tongue raising and retraction, and exaggerated jaw lowering and retraction (jaw opening) but not raising and protrusion (jaw closing). Individuals with mild dysarthria showed exaggerated tongue retraction. It is speculated that previously observed vowel errors to lower categories in individuals with ALS is partly due to direction-specific articulatory impairment presented in the current study.