Exercise May Help PALS Maintain Safe and Efficient Swallowing

Research Webinar: February 28, 2017
Title: Impact of Respiratory Strength Training on Breathing, Swallowing and Quality of Life in ALS
Speaker: Emily Plowman, Ph.D., CCC-SLP, Associate Professor, University of Florida

Respiratory strength training may help people with ALS swallow more safely and efficiently, according to Emily Plowman, Ph.D., of the University of Florida Health System (UFHS) in Gainesville, Fla. Dr. Plowman spoke in a recent webinar, sponsored by The ALS Association, entitled “Impact of Respiratory Strength Training on Breathing, Swallowing and Quality of Life in ALS.”

Dr. Plowman is co-director of the Swallowing Systems Core at UFHS, and is the recipient of a recent ALS Association Clinical Management Grant to study the effects of strength training.

The purpose of swallowing is to safely and efficiently transfer food and liquid to the stomach. Good swallowing is important not only for nutrition, but social interaction as well, as those who lose the ability to swallow safely often withdraw from social activities.

Swallowing is a continuous process, but can be divided into four phases. In the oral preparatory phase, food or liquids are transferred into the mouth, and any required chewing occurs. This is a voluntary phase, as is the second step, called the oral phase, in which the tongue pushes the “bolus” of food to the back of the mouth. The next two steps are involuntary. During the pharyngeal phase, muscles of the throat pull the epiglottis, a flap of tissue, over the airway to prevent food from passing into the trachea (airway) as food travels down the pharynx, or throat. Finally, in the esophageal phase, food is pushed by a wave of contraction down the esophagus (the tube carrying food into the stomach) to its destination. The entire process takes slightly over one second.

Dysphagia, or difficulty swallowing, can occur during any stage of swallowing. Dysphagia can lead to aspiration (food entering the trachea), a risk factor for choking and pneumonia. Inefficient swallowing can leave food residue in the throat, reducing nutrition as well.

“Eighty-five percent of people with ALS will experience dysphagia at some point,” Dr. Plowman said. A chief contributor is atrophy of the tongue muscle. Fatigue also contributes. Body mass index (BMI) at diagnosis, and maintenance of body weight, are predictors of survival. A feeding tube can be used to make up for lost calories, even in those who are still swallowing. “It can provide a back-up source of calories,” she said. Evidence suggests that a feeding tube provides an average eight-month survival benefit in ALS; more for those with limb-onset disease, less for those with bulbar-onset disease.

“We need more interventions,” Dr. Plowman continued, a need that led her to explore whether exercise could improve swallowing safety and efficiency. In a pilot study, she and her colleagues showed that strengthening the expiratory muscles—the ones that blow air out of the lungs—improved both expiratory muscle strength and swallowing movements. During training, the person tries to push air through a valve whose opening strength can be adjusted to allow the most beneficial release point. “It’s not a good idea to work with this system without a professional involved,” she said, since it is possible to set the valve at the wrong resistance point leading to exercising in the wrong way.

In a follow-up randomized trial, the eight-week training program resulted in a 30% improvement in
maximum expiratory pressure (important also for a strong cough), versus only 5% for those in the control group. The increase isn’t permanent, as the disease continues to weaken muscles, but the training does help delay the decline.

Dr. Plowman is currently conducting an Association-sponsored two-year trial of combined inspiratory and expiratory muscle training. Very preliminary data indicate it may provide highly significant improvements in both inspiratory (breathing in) and expiratory (breathing out) function, as well as improving cough strength.

“We were excited to see the results from Dr. Plowman’s initial studies,” commented webinar host and ALS Association Chief Scientist Lucie Bruijn, Ph.D., MBA, “and we look forward to finding out what the new study will teach us.”

The study aims to enroll a total of 48 people with ALS. It requires a baseline forced vital capacity of >70% of predicted, and participants must be able to visit Gainesville for clinical testing. Interested people can contact Dr. Plowman at eplowman@ufl.edu or her assistant Lauren Tabor at ltabor@ufl.edu.

More information on safe swallowing, including a helpful clinical guide and information on nutrition and feeding in ALS, can be found at the Swallowing Systems Core website.