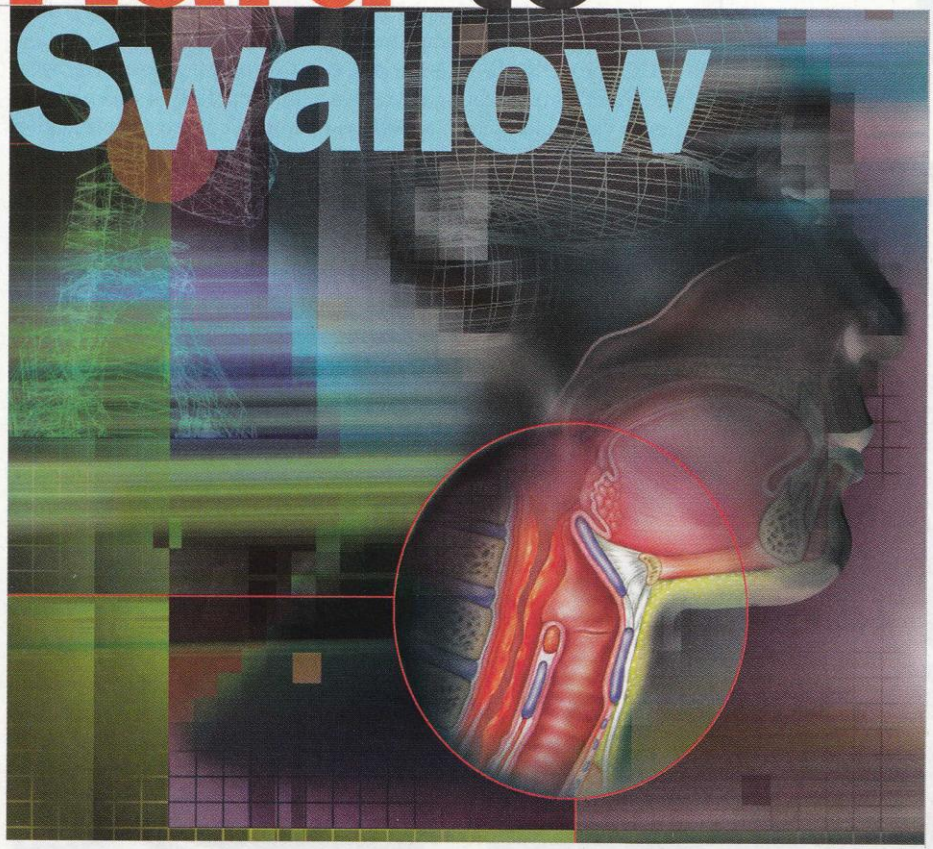
Hard to Swallow



ADVANCE

Neuromuscular e-stim offers another option to treat decreased laryngeal elevation.

BY RONDA POLANSKY, MS, CCC-SLP, RUSS CAMPBELL, PT, & RICK MCADOO, MS, CCC-SLP

With age comes a range of problems, from diminished sight and poor hearing to altered mobility and balance difficulties. In addition to those issues, as many as 70 percent to 90 percent of elderly patients have some degree of swallowing dysfunction.[1]

Dysphagia affects 15 million people in the United States and 45 percent to 87 percent of residents in long-term care.[2-4] Aspiration pneumonia is the fifth leading cause of death in the United States.[5] The cost to treat dysphagia that results in pneumonia is estimated to exceed $3 billion each year. Approximately 150,000 nursing home patients require hospitalization for pneumonia each year.[1]

The amount of time a speech-language pathologist spends caring for patients with dysphagia has increased over the past 20 years due to more referrals and better awareness among health professionals. Speech-language pathologists should play a critical role during the dysphagia recovery process.

DEALING WITH DYSPHAGIA

The symptoms of dysphagia vary with its cause and can have a devastating effect on quality of life. Direct and indirect treatments include oral-motor exercises, hyolaryngeal and Shaker exercises, the Mendelsohn maneuver and thermal stimulation.

These treatments are often difficult to perform with the geriatric population when there is a comorbidity with Alzheimer's disease, stroke or Parkinson's disease. Decreased laryngeal elevation is a common functional abnormality in pharyngeal dysphagia. Laryngeal elevation is important in airway protection to prevent penetration and aspiration.

Electrical stimulation (e-stim) has been used for years as a physical therapy modality. Although transcutaneous e-stim has received more attention as an adjunct to dysphagia treatment recently, clinicians don't know much about its effect on swallowing physiology. E-stim assists hyolaryngeal elevation and may increase sensory input to the central nervous system to enhance swallowing.[6]

Using neuromuscular electrical stimulation (NMES) to treat laryngeal elevation provides speech-language pathologists with another treatment option to help patients improve swallowing disorders, and enable them to return to feeding and a regular diet. When NMES is applied to the skin at low current levels, it activates sensory nerve endings in the surface layers, which provides sensory feedback to the peripheral and central nervous systems.

With increased intensity or pulse width, the electric field penetrates deeper and depolarizes nerve endings in muscles lying beneath the skin surface. The field also spreads with diminishing density to produce a muscle contraction, provided the peripheral nervous system is intact.

The U.S. Food and Drug Administration has cleared NMES for use for muscle re-education, to prevent or retard disuse atrophy and relax muscle spasms. In addition, NMES is FDA-approved to increase local blood circulation, maintain or increase range of motion and for immediate post-surgical stimulation of calf muscles to prevent deep vein thrombosis.

Speech-language pathologists should play a critical role during the dysphagia recovery process.

Using e-stim for this program is based on a standard muscle re-education protocol for small muscle groups. It's also applied to prevent or retard disuse atrophy of the supra-hyoid musculature due to inactivity.

To treat diminished hyolaryngeal elevation, electrodes are placed

on the submental area of the submandibular triangle, rather than the contraindicated portion of the anterior neck area, such as the carotid sinus or laryngeal region. This location is safer and more physiologically plausible.

By using standard equipment for this purpose, clinicians can modify the parameters to meet a patient's individual needs. This can be done with adequate electrotherapy training.

Used properly, NMES is safe and effective to treat poor hyolaryngeal elevation. Through continued research, this approach has been proven under videofluoroscopy, as well as fiberoptic endoscopic evaluation of swallowing (FEES) supporting laryngeal elevation, tongue base retraction and improved by-mouth intake.[7]

PUTTING IT TO THE TEST

A clinical trial evaluated the efficacy of using e-stim to the anterior digastrics and mylohyoid musculature (submandibular region) to promote improved laryngeal elevation and improved swallow function and safety. The rationale was that range of motion of the larynx during swallowing affects airway protection, and anterior motion of the hyolaryngeal complex is essential to successful function of the cricopharyngeal muscle. The trial focused on using these e-stim parameters with a restorative postural device to promote optimal posture and electrode conduction, combined with electrodes to re-educate and strengthen muscles related to laryngeal elevation.

The trial involved patients at long-term care facilities in Texas. Patients in group 1 received at least 20 therapy days of the NMES protocol, along with traditional therapy (79 patients). Patients in group 2 received traditional dysphagia therapy, which would have been per-

formed prior to NMES modality training or for patients who refused the NMES therapy protocol (46 patients).

Diagnoses included cerebrovascular accidents, Parkinson's, Alzheimer's, dementia, pharyngeal cancers and pneumonia from a pharyngeal dysphagia.

To date, 125 patients evaluated by modified barium swallow study (MBSS) had impaired laryngeal elevation as a primary or secondary dysfunction, causing aspiration or risk of aspiration to the degree that diet changes were necessary. A swallow severity scale was established to determine the diet.

The subset of patients who could tolerate at least 20 days of traditional dysphagia therapy while using the NMES protocol were included in the analysis as successfully completing the protocol. They were compared with 46 patients who received only traditional dysphagia therapy, but whose chart reviews noted they exhibited dysphagia with decreased laryngeal elevation as diagnosed from MBSS under fluoroscopy.

The charts were evaluated as to the number of patients who had an improved swallowing severity scale. The six scale levels are: nothing by mouth (0); therapeutic intake only (1); pleasure feedings only (2); modified diet including thickened liquids and puree or mechanical soft with strategies (3); strategies only, no alternate method of intake (4); and normal swallowing function (5).

The scale level improved from 2.33 to 3.72 in the NMES subgroup that received at least 20 days of the NMES protocol, and from 2.52 to 2.6 in the traditional therapy group. Not all of the patients were able to achieve a period of at least 20 days in the traditional therapy group.

The average number of therapy days was 36.79 in the NMES subgroup and 19 in the traditional study group. Three-fourths of the patients who received at least 20 days of the NMES protocol had a diet upgrade.

The results of this clinical trial suggest that patients who present with dysphagia, due in part to diminished laryngeal elevation, and receive NMES to the laryngeal elevators improve diet upgrades and swallow function at a higher percentage. Throughout the trial, there were more than 5,814 therapy visits using this protocol. This suggests that it's a safe adjunct to treat patients with pharyngeal dysphagia.

As research expands in this area, clinicians will be able to determine more about the physiological effects on the neck muscles and swallowing functions. ■

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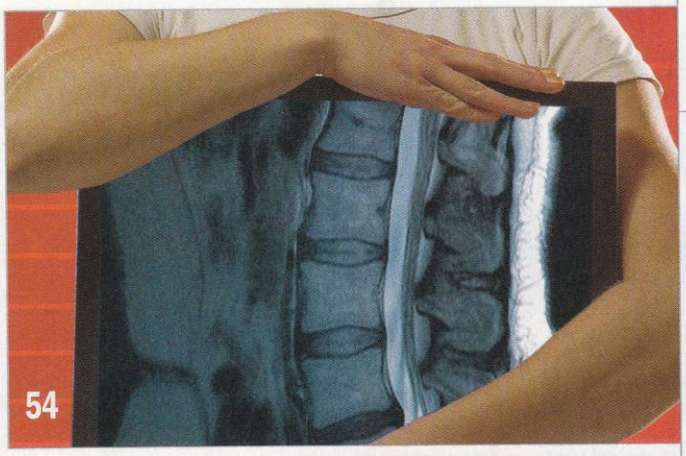

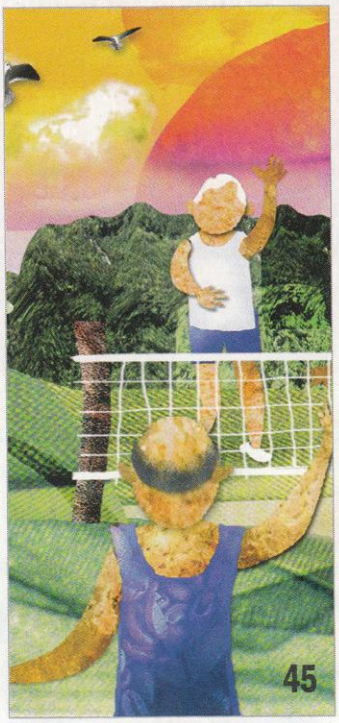

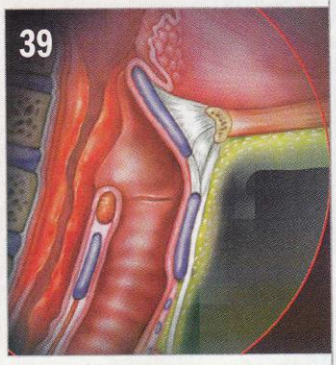

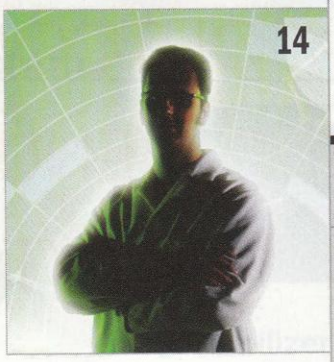

About the Cover

Emergency medicine physician Mark Ulitsky, MD, and Micki Wach, PTA, are on staff at Jeanes Hospital in northeast Philadelphia. As new awareness of the benefits of acute-stage rehab emerges, the separate worlds of emergency care and rehab are moving closer together—and patients are realizing higher outcomes.

Photo by Kyle Kielinski

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