c. the entire Steering Committee of the Special Interest Division requesting the review.

d. at least two members of the Evidence Panel.

2. Approval of which of the following groups is necessary before an EBSR is submitted to the ASHA Legislative Council?

a. Special Interest Division Steering Committee

b. Board of Division Coordinators

c. National Center for Evidence-Based Practice

d. Appropriate ASHA National Office Practices staff

3. Which of the following was a reason for the development of an ASHA-specific system of levels of evidence?

a. Existing systems lacked explicit criteria for assessing study quality.

b. The price of existing systems was prohibitive.

c. Existing systems addressed single-subject designs.

d. Existing systems failed to address randomized controlled trials.

4. Which study quality criterion in the ASHA system applies only to controlled trials?

a. Study design

b. Intention to treat

c. Statistical significance

d. Sampling

5. What is the typical size of an evidence panel?

a. 1-2 members

b. 3-5 members

c. 6-8 members

d. 10 members

Food for Thought

Primum Non Nocere: The Potential for Harm in Dysphagia Intervention

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Many of us are familiar with the famous medical dictum *Primum Non Nocere* (First, do no harm) attributed by some to the 4th Century B.C. Greek physician Hippocrates and by others to the 2nd Century B.C. Roman physician Galen. Yet, I suspect that most of us have given this dictum little more than passing consideration when it comes to our daily lives as swallowing clinicians. We are accustomed to expecting swallowing interventions to result in positive outcomes, and at worst we expect them to be relatively benign. Yet, as we learn more about swallowing and explore new frontiers in treatment, we are reading increasingly frequent accounts of undesirable or harmful outcomes arising from well-intentioned swallowing interventions. These accounts need not necessarily alarm (although that may sometimes be appropriate), but they should prompt us to question whether we are sufficiently aware of the potential negative consequences of the swallowing treatments we recommend to our patients. In this article, I will highlight several examples of reported negative outcomes from swallowing intervention and will pose questions about others. My intent is to challenge readers to think about all possible outcomes during the treatment planning and selection process.

Postural Modifications

Postural modifications like chin tucks, head turns, and head tilts have been reported to improve bolus control, vocal cord closure, aspiration, and bolus clearance through the pharyngoesophageal segment. According to one of the original (and most cited) articles documenting the benefits of postural modifications, one or more of these techniques can be used to successfully eliminate aspiration in the majority of patients (Rasley et al., 1993). Of all the postural techniques explored in Rasley et al.'s article, the chin tuck was performed most often. In fact, for patients who only aspirated on larger volumes of 5 and 10 milliliters or cup-drinking, it was the only postural maneuver that was tested. Rasley and colleagues reported that the chin tuck was successful in reducing or eliminating aspiration in only 60% of these subjects and that 26/84 patients continued to aspirate despite use of the maneuver. A subsequent study (Shanahan, Logemann, Rademaker, Pauloski, & Kahrilas, 2002) explored the phenomenon of aspiration despite the use of a chin tuck in more detail and reported that individuals who were more likely to have this outcome were younger patients with neurogenic dysphagia who aspirated material from the pyriform sinus rather than from the valleculae. The authors specifically suggested that, when material is in the pyriform sinuses, a chin tuck may cause changes in the dimensions of the pharynx that squeeze material towards the airway. What are we to make of these data? Certainly, these articles suggest that instrumental evaluation is important both to determining the appro-

priateness and the safety of a chin-tuck posture.

Swallowing Exercises

It is becoming more common to read and hear about the principles of exercise physiology at workshops and courses regarding dysphagia intervention. Recent literature provides evidence to suggest that the muscles of the head and neck (including the tongue) show age-related changes, similar to those seen in limb muscles (e.g., Robbins, 1999). One implication of this finding is that exercise may be used to improve muscle tone and function. Recent examples of swallowing treatment techniques that follow this principle include the Shaker exercise (Easterling, Grande, Kern, Sears, & Shaker, 2005; Easterling et al., 2000; Shaker et al, 2002.; and Shaker et al., 1997); tongue-pressure strengthening exercises (Hind, Nicosia, Roecker, Carnes, & Robbins, 2001; Lazarus, Logemann, Huang, & Rademaker, 2003; and Robbins et al., 2005); effortful swallows and Mendelsohn maneuvers performed under sEMG biofeedback guidance (Bryant, 1991; Crary, 1995; Crary & Groher, 2000; Crary, Carnaby-Mann, Groher, & Helseth, 2004; Huckabee & Cannito, 1999); and the Lee Silverman Voice Treatment (Sharkawi et al., 2002). Reports on all of these techniques suggest that promising outcomes may be expected, but a number of important questions remain (and are frequently raised in forums like the Division 13 e-mail discussion list). For example, can one exercise too frequently or too hard? Is it better to practice isometric (repeated) or isotonic (sustained) exercises? How quickly are therapeutic benefits lost if practice is not maintained? One interesting report in our literature emphasizes how careful we need to be that in teaching a maneuver we do not inadvertently contribute to negative changes elsewhere in the swallowing system. Garcia, Hakel and Lazarus (2004) described the treatment of an adolescent with severe dysphagia following surgical excision of a skull base tumor. The patient appeared to be an appropriate candidate to learn an effortful swallow to facilitate improved bolus transport and clearance through the pharynx. However, the manner in which the patient learned the maneuver contributed to increased nasal backflow. The authors suggested that perhaps the timing of increased effort and associated elevated pharyngeal pressures was not optimum for improving this patient's swallowing. Although he had learned the steps of performing an effortful swallow, doing so with the correct timing and in the presence of a bolus proved too challenging. Interestingly, by "un-learning" the maneuver this patient was able to return to a regular diet 21 months after his original intervention. This finding reminds us that we need to re-evaluate the benefit of and need for specific interventions across the time course of swallow recovery.

Electrical Stimulation

One of the hottest topics in our field at the moment is that of electrical stimulation. Those who promote the technique have reported frequent positive outcomes, while others have questioned these claims on the basis of flaws in research design. I will freely acknowledge that I am in the latter camp (Steele, 2004; Steele, Thrasher, & Popovic, in press.). What evidence is there, then, to support caution with respect to electrical stimulation as a swallowing intervention? Some of the first papers in this respect came out of the electrical stimulation research performed in Dr. Shaheen Hamdy's lab in England (Fraser et al., 2002; Fraser et al., 2003; Hamdy, Rothwell, Aziz, Singh, & Thompson, 1998; Power et al., 2004). In these studies, electrical current was applied to various intra-oral and intra-pharyngeal sites, with the intention of exciting swallowing pathways and facilitating timelier swallow onset. Fascinatingly, there was a frequency-dependent outcome: Stimulation applied at some frequencies had the potential to speed-up swallowing onset, but at others, delayed swallowing onset in otherwise healthy subjects. Furthermore, these effects were not necessarily transient and were still observed an hour following the application of electrical current. These studies suggest that electrical stimulation is a powerful technique but that precision is needed in selecting the correct parameters to achieve desired outcomes. Another recent study (Suiter, Leder, & Ruark, 2006) suggested that the amplitude of submental muscle contraction is not detectably altered after a 2-week course of 10 one-hour sessions of surface neuromuscular electrical stimulation. This study prompts us to ask whether the positive outcomes that have been reported following similar courses of treatment (Freed, Freed, Chatburn, & Christian, 2001) can reasonably be attributed to the intervention or whether other factors might explain the observed improvements. Finally, Ludlow et al. (2006) recently published the findings of a study evaluating the physiological impact of surface electrical stimulation measured using videofluoroscopy. These authors showed that the location of electrode attachment is crucial to the outcome. When electrical current was administered simultaneously through surface electrodes positioned over both the submental and laryngeal muscles the observed effect was a lowering of the hyoid at rest. The authors caution that the effect of a lowered hyoid position on swallowing safety should be carefully evaluated when considering this type of therapy.

Diet Texture Modification

Diet texture modification is by far the most commonly applied intervention for dysphagia. It has been called a "cornerstone" of our prac-

tice (Robbins et al., 2002), yet recent articles continue to show that variability in thickening practices and in the time-dependent viscosity flow characteristics of thickened liquids challenge our conventional assumptions regarding the benefits of these products (Cichero, Jackson, Halley, & Murdoch, 2000a; Cichero, Jackson, Halley, & Murdoch, 2000b; Garcia, Chambers, Matta, & Clark, 2005; Glassburn & Deem, 1998; Steele, 2005). So, even if they aren't always effective in preventing aspiration or improving swallowing, can we at least argue that thickened liquids don't hurt our patients? Unfortunately, this may not be the case. There is some evidence that patients who are prescribed texture modified diets, including thickened liquids, are at greater risk for malnutrition and dehydration (Finestone, Foley, Woodbury, & Greene-Finestone, 2001; Finestone, Greene-Finestone, Wilson, & Teasell, 1995). Whether such negative outcomes result primarily from reduced intake (because the patients find these products unpalatable) or whether the carbohydrate content of thickened liquids contributes directly to reduced hydration remains a topic of debate. It is clear, however, that we need to remember that texture modified diets often negatively affect the patient's quality of life (Bennett & Steele, 2005; Colodny, 2005).

Supraglottic Swallow

Another treatment technique that has been in our inventory of possible interventions for many years is the supraglottic swallow. This technique was first developed with the head and neck cancer population, specifically those who had undergone supraglottic laryngectomy to improve laryngeal closure during swallowing. Over the years, clinicians have generalized the technique to other populations. In 2002, an important article in our literature explored the possibility that the effortful and intentional breath-holding that occurs during correct performance of this maneuver (and its close relative the super-supraglottic swallow) might have undesirable cardiac consequences for some patients (Chaudhuri et al., 2002). These authors examined use of the supraglottic swallow and the super-supraglottic swallow in three groups of patients. One group had a history of recent cerebrovascular accident (CVA) with concomitant history of coronary artery disease. The second group had a history of CVA with no evidence of coronary artery disease. The final control group had a history of orthopedic dysfunction without history of dysphagia or coronary artery disease. Chaudhuri et al. reported that 13 of 15 subjects in the CVA groups showed abnormal cardiac findings during swallowing treatment with these two strategies. No cardiac abnormalities were noted in the control subjects. Consequently, generalization of this technique to stroke patients may be contraindicated.

Conclusion

These examples are not necessarily a comprehensive list, but they do provide considerable food for thought regarding the potential for swallowing interventions to result in unintended negative outcomes. To be responsible as clinicians, we must remain vigilant in maintaining our knowledge of treatment effects and must become critical consumers of the literature, so that we can be well informed when recommending treatment to our patients. Of course, one report of negative outcomes must be judged as cautiously as one claim of positive outcomes, and careful rigorous replications of studies with adequate controls and respectable sample sizes are needed to advance our collective knowledge of the best way to approach dysphagia in each individual patient we see.

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Therese O'Neil-Pirozzi, Column Editor

Student Abstracts Column

The purposes of this Student Abstracts column are:

1. To provide a mechanism for Division 13 affiliates to be updated on recent quality field-related research, and
2. To provide graduate students with an opportunity to identify a recent swallow-related research article, review it, and abstract it for Division affiliates.

Please invite all of the graduate students who you teach and/or supervise to consider taking advantage of this opportunity. The abstract guidelines are posted in the Division 13 affiliates-only pages (www.asha.org/about/membership-certification/divs/div13member/), as are a number of abstracts.

Erica Jensen reviews an article regarding a study that found evidence of the effectiveness of computer-based dysphagia training for nursing staff. Erica studied dysphagia with Professor Lisa Crujido at Arizona State University.

Continued on page 24

Continuing Education Questions

1. One of the reported negative side effects of the supraglottic swallow in stroke patients is

a. shortness of breath.
b. cardiac arrhythmia.
c. dizziness.
d. reduced aspiration.

2. A potential negative side effect of thickened liquids is

a. low blood sugar
b. increased thirst
c. dehydration
d. weight loss

3. Surface electrical stimulation applied simultaneously in the submental and laryngeal regions at rest is reported to

a. improve upward hyoid excursion.
b. improve the timing of swallow onset.
c. increase amplitudes of submental muscle contraction.
d. lower the position of the hyoid bone.

4. The famous dictum, *Primum non nocere*, can be translated to mean

a. "First, do no harm."
b. "Always be honest."
c. "Do not deceive."
d. Do unto others as you would have them do unto you.

5. The chin-tuck posture

a. is reported to eliminate aspiration in patients with neurogenic dysphagia.
b. improves swallowing for patients with both vallecular and pyriform sinus residue.
c. may not reduce the risk of aspiration in patients with pyriform sinus residue.
d. may induce cardiac arrhythmia in stroke patients.