Dysphagia Following Stroke

Second Edition

A Volume in the Clinical Dysphagia Series

Stephanie K. Daniels, PhD
Maggie-Lee Huckabee, PhD

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Foreword

Stephanie Daniels and Maggie-Lee Huckabee are rehabilitation scientists of the first order. They have spent portions of their professional lives in both laboratory and clinic. For them, the person with dysphagia is not merely a set of structures and muscles working in disharmony. Treatment is not merely an array of mechanical manipulations. Evidence-based practice is not merely the data. Swallowing, they know, is influenced by the sight, smell, taste, and texture of food; by affect, experience, and expectation; by environment and need. Treatment is an often tumultuous, always complex set of interactions among two or more people. Evidence-based practice rests equally on evidence, clinical acumen, and what each patient wants and needs. They know that data have no frontal lobes.

The second edition of *Dysphagia Following Stroke* reflects who they are and what they want for their profession and the patients it serves. In the first edition's Foreword, I said clinical gems could be found on every page, gems hardened by the pressure of scientific rigor and cut and polished by the authors' clinical experiences. The second edition contains more gems, more resistant to cracking and chipping and with greater sheen. They have written a new chapter on screening, emphasizing its purposes, procedures, and data. Their chapters on rehabilitation are expanded and alone are worth this book's cost. Their new content on neuromodulation in rehabilitation using modalities such as transcranial magnetic stimulation makes this a book for the future as much as for the present. The updated list of references is complete and an invaluable resource for readers interested in primary sources as a foundation for their clinical or

research efforts. In a chapter called "Lagniappe"—a little something extra—they offer tastings on items such as commercialization that may be honey to some and sea urchin to others. "Good on them." Books are ideal environments for thoughtful discussions of complex and contentious issues.

Daniels and Huckabee ended the Preface of their first edition with a warning to me, the Dysphagia Series Editor, that they would never again write a book. I responded in my Foreword that if they continued to feel that way after the very real anguish of book writing dissipated, their wishes would, of course, be honored. However, having benefited from the usefulness of their first "practical sourcebook," I ended my Foreword with the hope that they would reconsider. They have, and the second edition of *Dysphagia Following Stroke* is the result. Students, practitioners, and scientists may want to express appreciation. This is a book for the pocket and not the shelf.

Jay Rosenbek, PhD
Professor and clinician, University of Florida
Editor, Clinical Dysphagia Series

4 Screening for Dysphagia in Acute Stroke Patients

BACKGROUND OF SCREENING SWALLOWING IN STROKE

Early detection of dysphagia in acute stroke is critical, as it allows for immediate intervention, thereby reducing mortality, morbidity, length of hospitalization, and health care costs (Hinchey et al., 2005; Martino, Pron, & Diamant, 2000; Odderson & McKenna, 1993). As such, screening of swallowing has become best practice in the management of stroke patients and is the important first step in the evaluation process of dysphagia in stroke (Figure 4–1). Screening can be defined as a brief assessment that is easy to administer and minimally invasive. No diagnosis is made with a screening. In the case of dysphagia, the purpose is to determine who is *at risk* for dysphagia and/or aspiration and consequently warrants referral to speech pathology. Screening results may be either positive or negative. If the screening results are negative (i.e., individual passes), oral intake without any specific modifications can be ordered by other members of the multidisciplinary team, and referral to speech pathology for assessment of swallowing should not be needed. On the other hand, if screening results are positive (i.e., individual fails), the individual is made nil per os/nothing by mouth—NPO/NBM—including medication, and referral to speech pathology is expedited. It is important to note that compensatory strategies (posture or diet modification) should *not* be implemented based on the results of a screening.

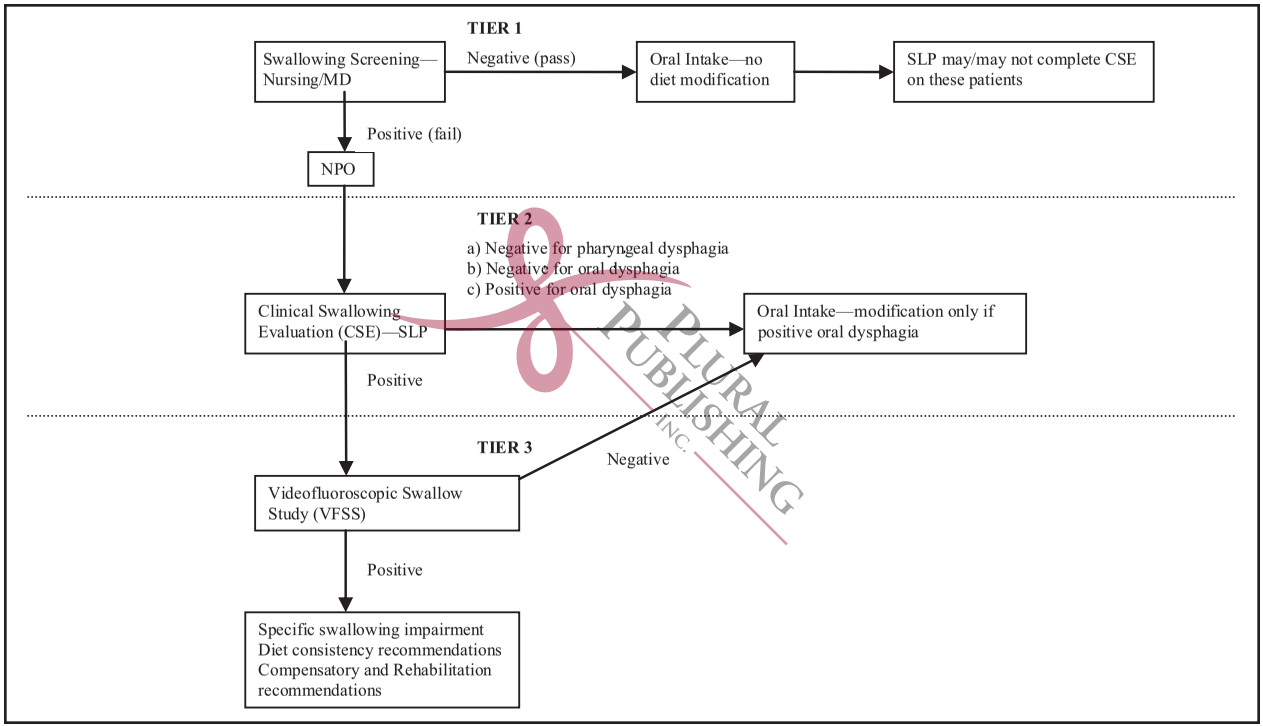

Figure 4–1. Levels of swallowing assessment.

When a formal swallowing screening is in place, morbidity associated with dysphagia decreases (Hinchey et al., 2005; Odderson, Keaton, & McKenna, 1995), health care providers' adherence to screening guidelines is improved (Hinchey et al., 2005), and there is earlier administration of first-dose aspirin (Power, Cross, Roberts, & Tyrrell, 2007). These findings have led to the inclusion of swallowing screening prior to the administration of food, liquid, or medication, including aspirin, in individuals presenting with stroke symptoms in the American Heart Association/American Stroke Association guidelines (Adams et al., 2007). In accordance with this guideline, the Veterans Health Administration advocated that screening of swallowing be a quality performance measure in acute stroke (Bates et al., 2005). Moreover, the Office of the Inspector General issued Veterans Health Administration Directive 2006-032 mandating that the initial nurse assessment must include screening of swallowing. Similar guidelines are emerging or already exist in many other countries and many other health systems. Completion of a swallowing screening prior to administration of oral intake was a Joint Commission–required performance measure for Primary Stroke Center Certification in the United States until 2010, when it was removed due to a lack of systematically defined standards for what constitutes a valid screening tool for swallowing (Lakshminarayan et al., 2010). The discontinuation by the Joint Commission, however, does not indicate that screening swallowing is no longer warranted. Rather, it suggests that further research is warranted and consensus on a swallowing screening tool (SST) should be determined.

COMPONENTS OF A GOOD SCREENING TOOL

All good testing tools, whether diagnostic or screening, must be **valid**, **reliable**, and **feasible**. Validity of the SST is critical; however, since disciplines without expertise in dysphagia may be involved in

screening swallowing, issues surrounding education, sustainability of skills, and feasibility become of even greater importance.

Validity

Validity is the degree to which a test measures what it is purported to measure (Sackett, Strauss, Richardson, Rosenberg, & Hayes, 2000; Streiner, 2003). In terms of dysphagia, the outcomes measured are risk of dysphagia and/or risk of aspiration. It must be remembered that aspiration is a result of dysphagia. Although aspiration is frequently associated with dysphagia, an individual may have significant dysphagia without aspiration. We would argue that optimally refined screening tools would identify individuals at risk for dysphagia, not just aspiration.

In screening, validity is frequently measured in terms of *sensitivity* and *specificity*. Sensitivity is the probability that a clinical sign (e.g., cough with water) will be present given that an impairment (e.g., dysphagia) is present. High sensitivity yields low false negative results; that is, the clinician can be confident that most patients with dysphagia are identified. Conversely, if the SST has low sensitivity in predicting dysphagia, false negative rates will be high. Patients would have a negative screening, yet they would actually have swallowing problems. Specificity is the probability that a clinical sign will be absent given that an impairment is absent. A test with high specificity will have a limited number of false positive results; the majority of patients with negative screening results will not have dysphagia. Low specificity, however, would result in a high false positive result, with a large percentage of patients without dysphagia having a positive SST.

Ultimately, high sensitivity appears to be the most important feature in a stroke SST due to increased morbidity and mortality associated with dysphagia, which necessitates the requirement for low false negative results. Frequently, specificity will be sacrificed to

achieve high sensitivity; however, low specificity cannot be ignored. At a minimum, it can delay the receipt of medication and nutrition and lead to overreferral to speech pathology. At its most severe, it can result in the placement of unwarranted nasogastric feeding tubes, which are associated with medical complications (Ciocon, Silverstone, Graver, & Foley, 1988), particularly in individuals with acute stroke (Langdon, Lee, & Binns, 2009). Hence, accuracy in identification of individuals with suspected dysphagia would logically appear greatest when using a tool with both high sensitivity and high specificity. If an SST with both high sensitivity and specificity cannot be identified, then these two measures must be balanced with the needs of the hospital. If speech pathology services are readily available on a daily basis, then high sensitivity may be favored over high specificity. If speech pathology services are limited—for instance, weekend coverage is not available—reduced specificity would not be acceptable.

Two other important factors in validity are *positive predictive value* and *negative predictive value*. Unlike sensitivity and specificity, which provide information concerning correct classification of individuals who do or do not present with a positive SST, predictive values deal with the proportion of individuals with or without a positive SST who do and do not have dysphagia identified on an instrumental swallowing examination (e.g., videofluoroscopic swallowing study [VFSS]). Positive predictive value is the probability of having the condition (e.g., dysphagia) if the screening is positive (i.e., fail the screening). Low positive predictive value indicates an increase in false positive results. Negative predictive value is the probability of not having the condition (e.g., dysphagia) if the screening is negative (i.e., pass the screening). Low negative predictive value indicates an increase in false negative results. Predictive values are highly influenced by the prevalence of the condition (e.g., dysphagia) in the studied population. As with sensitivity and specificity, the higher the predictive value, the better. Last, one should consider *likelihood ratios*, primarily positive likelihood ratios greater than 1. A positive