



CIGNA MEDICAL COVERAGE POLICY

This Coverage Policy should NOT be used for Great-West benefit plans.

Subject **Speech Therapy for Swallowing and Feeding Disorders**

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Coverage Policy

Swallowing/feeding therapy is considered a form of speech therapy. Coverage for outpatient speech therapy and speech therapy provided in the home is subject to the terms, conditions and limitations of the Short-Term Rehabilitative Therapy benefit as described in the applicable benefit plan's schedule of copayments. Many benefit plans include a maximum allowable speech therapy benefit for duration of treatment or number of visits. When the maximum allowable benefit is exhausted, coverage will no longer be provided even if the medical necessity criteria described below are met. Many benefit plans specifically exclude behavioral training and treatment for or in connection with education and training.

Some benefit plans specifically exclude maintenance or preventive treatment consisting of routine, long-term or non-medically necessary care provided to prevent recurrences or to maintain the individual's current status.

If coverage for this service is available, the following conditions of coverage apply.

CIGNA covers swallowing/feeding therapy as medically necessary for individuals with swallowing and children with a feeding disorder when ALL of the following criteria are met:

- The swallowing or feeding disorder is the result of an underlying medical condition.
- The medical necessity of the therapy has been demonstrated by results of testing with a videofluorographic swallowing study (VFSS) or other appropriate testing in combination with an evaluation by a certified speech-language pathologist.

- The therapy plan includes specific tests and measures that will be used to document significant progress.
- Meaningful improvement is expected from the therapy.
- The treatment includes a transition from one-to-one supervision to an individual or caregiver provided maintenance level on discharge.

CIGNA does not cover swallowing/feeding therapy for food aversions because it is considered behavioral training and not medically necessary.

CIGNA does not cover electrical stimulation for swallowing/feeding disorders because it is considered experimental, investigational or unproven.

Note: Outpatient swallowing/feeding therapy is appropriate for most individuals. Coverage is limited to outpatient programs unless the individual meets medical necessity criteria for an inpatient stay.

General Background

Difficulty with swallowing is also referred to as dysphagia. This condition is also known as a deglutition disorder. Pain in swallowing may accompany dysphagia, and this is referred to as odynophagia. An inability to swallow is known as aphagia. Swallowing is a complex function that involves the mouth, pharynx, larynx and esophagus. The swallowing process has four phases (Palmer, 2000):

- Oral preparation: This phase refers to processing of the food bolus to prepare it for swallowing.
- Oral propulsive: This phase refers to propelling food from the oral cavity to the back of the mouth.
- Pharyngeal: This phase refers to the action of moving food into the pharynx to propelling the bolus down.
- Esophageal: This phase refers to the food bolus moving down the esophagus to the stomach with a peristaltic wave.

In infants, the first phase also includes the sucking reflex. The sucking reflex initiates swallowing in the infant by stimulation of the lips and deeper parts of the oral cavity (Derkey and Schechter, 1998). The mandible, maxilla, upper gums, lips, palate and cheeks are necessary for compression of the nipple and expression of contents. Any defect of lips, tongue, palate, mandible, maxilla or cheeks may create problems in the first phase of deglutition in an infant. Oral skills such as sucking or chewing solids are learned only at certain ages. Infants who do not learn these skills at the specific times in their development may have a difficult time mastering them at a later time, leading to feeding problems.

Dysphagia is classified according to which phase of swallowing is affected (Palmer, 2000). The disorders in the oral phase usually result from impaired control of the tongue. There may be difficulty initiating swallowing, or the liquids may spill prematurely into the pharynx. With a dysfunction in the pharyngeal phase, food transport to the esophagus may be impaired. This may be caused by mechanical obstruction, motility disorder, or impaired opening of the lower esophageal sphincter.

Oral dysphagia is seen most commonly in children with neurodevelopmental disorders (Darrow and Harley, 1998). These children will exhibit poor lingual and labial coordination. This will result in loss of food and a poor seal for sucking or removing food from a spoon. These children may also have difficulty with coordination of sucking, swallowing and breathing. Children with pharyngeal dysphagia may demonstrate the symptoms of oral dysphagia, along with coughing, gagging and choking with foods and liquids. However, the signs of pharyngeal dysphagia may be subtle. In this situation, the children may suffer from recurrent upper respiratory infections or have a history of pneumonia.

Infants and children with cleft lip and/or palate can usually feed by mouth with some adjustments. These patients may have difficulties maintaining sucking pressure; however, the swallowing mechanisms are usually normal. If milk or formula can reach the oropharynx, then the natural swallowing reflexes can move it to the esophagus (American Cleft Palate-Craniofacial Association [ACPA], 2004). Feeding times may be lengthened

considerably due to difficulties with maintaining the sucking pressure. There may also be breathing problems present during the feeding.

The most common signs and symptoms of dysphagia are coughing or choking while eating, or the sensation of food sticking in the throat or chest. Signs and symptoms of dysphagia may also include (Palmer, 2000): difficulty initiating swallowing, drooling, unexplained weight loss, change in dietary habits, recurrent pneumonia, change in voice or speech, nasal regurgitation, and dehydration. Infants may exhibit a feeding disorder with signs and symptoms that include: refusal to eat or drink, failure to gain weight, aversions to specific food types or textures, recurrent pneumonias and chronic lung disease. Consequences of dysphagia and feeding disorders may be severe and may include: dehydration, malnutrition, aspiration, choking, pneumonia, and death.

Evaluation of swallowing and feeding disorders first includes performing a history and physical exam. Objectives of the history should include: identifying the anatomic region involved and obtaining clues to the etiology of the condition. This may include information regarding the onset, duration and severity, presence of regurgitation, the perceived level of obstruction and presence of pain or hoarseness, and presence of other disorders. During the physical examination, the patient should be observed during the act of swallowing. A clinical dysphagia evaluation is usually completed by a speech-language pathologist. The examination will include: assessment of posture, positioning, patient motivation, oral structure and function, efficiency of oral intake and clinical signs of safety. A variety of positions, feeding techniques and adaptive utensils may be used during the examination. In infants, the oral-motor assessment includes evaluation of reflexive rooting and non-nutritive sucking (Darrow and Harley, 1998). Two scales that may be used in evaluation of infants include the Neonatal Oral-Motor Assessment Scale (NOMAS) and the Multidisciplinary Feeding Profile (MFP). Infants and children may require additional assessments, as growth, development and changes in medical condition may affect the swallowing process.

The videofluorographic swallowing study (VFSS) is the gold standard for evaluating the mechanism of swallowing (Palmer, 2000). VFSS is also referred to as modified barium swallow. During this study, the patient will eat and drink foods mixed with barium while radiographic images are observed on a video monitor and recorded on videotape. Infants with adequate suck and swallow may be given liquid barium through nipple or thin purees, or tube feedings may be used (Darrow and Harley, 1998). This test is ideally performed jointly by physician and a speech-language pathologist. The study will demonstrate anatomic structures, the motions of these structures, and passage of the food through the oral cavity, pharynx and esophagus (Palmer, 2000). This test may also be used to test the effectiveness of compensatory maneuvers that are used to improve swallowing. This test cannot be performed on infants and children who are unable to swallow. In addition, infants and children with oral aversion and some feeding disorders may not ingest a sufficient amount of barium to provide a meaningful study (Rudolph, 2003).

Additional diagnostic testing that may be employed includes (Palmer, 2000; Darrow and Harley, 1998):

- Esophagoscopy: This test may be used to rule out neoplasm, particularly in patients who complain of thoracic dysphagia or odynophagia.
- Esophageal manometry and pH probe studies: These tests may be used when a motility disorder or gastric esophageal reflux disease is suspected.
- Electromyography: This test is indicated in patients with motor unit disorder such as polymyositis, myasthenia gravis, or amyotrophic lateral sclerosis.
- Fibroptic endoscopic examination of swallowing (FEES): This test is performed with a transnasal laryngoscope to assess pharyngeal swallowing. This test may be helpful when a VFSS is not feasible.
- Ultrasound imaging: This testing has been used to a limited extent on infants to assess the oral phase of swallowing. The technique is limited to infants, since teeth will interfere with the sound signal. This method will permit studying of infants during breast-feeding, since contrast media is not required.

Underlying medical conditions that may cause dysphagia include, but are not limited to (Palmer, 2000) (Rudolph and Link, 2002):

Neurological disorders and stroke	<ul style="list-style-type: none">• cerebral infarction• brain-stem infarction• intracranial hemorrhage
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	<ul style="list-style-type: none"> • Parkinson's disease • multiple sclerosis • amyotrophic lateral sclerosis • poliomyelitis • myasthenia gravis • dementias • cerebral palsy
Structural lesions	<ul style="list-style-type: none"> • thyromegaly • cervical hyperostosis • congenital web • Zenker's diverticulum • ingestion of caustic material • neoplasm
Connective tissue disease	<ul style="list-style-type: none"> • polymyositis • muscular dystrophy
Iatrogenic causes	<ul style="list-style-type: none"> • surgical resection • radiation fibrosis • medications
Anatomic or congenital abnormalities	<ul style="list-style-type: none"> • cleft lip and/or palate • abnormalities of the tongue • velopharyngeal insufficiency • tonsillar hypertrophy • Pierre Robin sequence • laryngeal cleft • tracheoesophageal cleft • tracheoesophageal fistula • congenital esophageal atresia • esophageal stricture, web or ring

Therapy for Swallowing and Feeding Disorders

When possible, initial treatment of swallowing and feeding disorders is aimed at treating the underlying cause. Depending on the etiology, surgery or pharmacologic therapy may be used. However, the causes of many of the disorders resulting in dysphagia may not be amenable to pharmacologic therapy or surgery. In these cases, a referral to a speech-language pathologist for evaluation is appropriate.

The goals of therapy include reducing aspiration, improving the ability to eat and swallow, and optimizing the nutritional status (Palmer, 2000). The choice of therapies is directed by the videofluoroscopic findings and the individual's ability to comprehend and cooperate with the various strategies (Cook and Kahrilas, 1999).

The specific strategy that is utilized will depend on the dysfunction that is present. Swallowing therapy strategies may include (Agency for Health Care Research and Quality [AHRQ], formerly the Agency for Healthcare Policy and Research [AHCPR], 1999):

- Dietary modifications: This technique may be used if the patient aspirates on only certain substances while swallowing.
- Swallow therapies: These therapies include the following:
 - Compensatory techniques: This technique teaches the patient postural maneuvers to compensate for swallowing difficulty.
 - Indirect swallow therapy: This technique teaches the patient exercises to strengthen impaired or weakened muscles.
 - Direct swallow therapy: This technique teaches the patient exercises to perform during the swallowing process.

Esophageal phase swallow disorders are generally not amenable to oral-motor and swallow therapy. Positioning changes, changes in food characteristics and timing may make a difference with these conditions.

When a patient is unable to achieve adequate alimentation and hydration by mouth, enteral feedings through a nasogastric tube (NG) or a percutaneous endoscopic gastrostomy (PEG) may be necessary. The presence of a feeding tube is not a contraindication of therapy. Removal of the feeding tube may be a goal of therapy.

Swallowing/feeding therapy is generally provided by a speech-language pathologist. At times an occupational therapist may also provide some of the treatment. There should be a documented plan of care that includes specific measures that will be used to assess progress and objective long- and short-term goals. Each treatment provided and patient response should be documented in the progress notes. Assessment of progress toward goals should be made on a regular basis, approximately every 4–6 weeks. Goals should be re-evaluated and may be revised depending on progress and the patient's condition.

Literature Review: Review of the literature indicates that few clinical trials have been undertaken to assess the effects of treatment for dysphagia.

Foley et al. (2008) reported on a systematic review of randomized controlled trials that evaluated dysphagia treatment post-stroke. Fifteen studies were included that covered a broad range of treatments. The treatments included: texture-modified diets, general dysphagia therapy programs, non-oral (e.g., enteral) feeding, medication and physical and olfactory stimulation. There was heterogeneity of the treatments evaluated and the outcomes assessed. This precluded the use of pooled analyses. The review found that NG tubes do not appear to be associated with an increased risk of death compared with (PEG) feeding tubes. A second finding of the review was that general swallowing treatment programs are associated with a reduced risk of pneumonia in the acute stage of stroke. Swallowing therapies and interventions in current practice appear to be based on clinical experience approaches that are physiologically based. The authors concluded that there is a need for high-quality research to identify effective dysphagia treatments post-stroke.

Carnaby et al. (2006) conducted a randomized, controlled trial to compare standard low-intensity and high-intensity behavioral interventions with usual care for dysphagia. Three hundred and six patients were randomly assigned to receive usual care (n=102), prescribed by their attending physician; standard low-intensity intervention (n=102), with frequency of three times weekly for up to a month; or standard high-intensity intervention and dietary prescription (n=102), with frequency of at least daily for up to a month. The primary outcome measurement was survival, free of an abnormal diet at six months. Sixty patients died and three patients were lost to follow-up before the six month follow-up. The control, or usual care, consisted of patient management by the attending physicians as per usual practice. This may include referring patient to speech pathology service, and treatment, if offered, consisted mainly of supervision for feeding and precautions for safe swallowing. Low-intensity interventions comprised swallowing compensation strategies, mainly environmental modifications, safe swallowing advice and appropriate dietary modification, under the direction of the speech pathologist. Standard high-intensity swallowing therapy consisted of direct swallowing exercises and appropriate dietary modification, under the direction of the study-speech pathologist.

The study did not indicate that a standard program of swallowing therapy given early to patients with acute stroke and maintained as required is associated with a significant increase in the proportion of patients who survive free of an abnormal diet by six months after stroke. In addition, there was no significant effect of swallowing therapy on death, institutionalization and dependency at six months after stroke. However, the study did indicate that a consistent, albeit nonsignificant trend in favor of swallowing therapy versus usual care for these outcomes and a significant rise in the proportion of patients who achieved functional swallowing and a decrease in the proportion of patients who had a dysphagia-related medical complication (especially aspiration pneumonia) and died or needed institutionalization. The authors concluded that the results of the study lend support to the potential value of behavioral swallowing interventions after acute stroke to help with the return to prestroke swallowing function and a decrease in dysphagia-related adverse outcomes.

A Cochrane review (Deane, et al., 2001) was conducted to compare the efficacy and effectiveness of non-pharmacological swallowing therapies for dysphagia in patients with Parkinson's disease. The researchers noted that no controlled trials, randomized or otherwise, were found that examined the efficacy of non-pharmacological swallowing therapy for treatment of dysphagia in patients with Parkinson's disease. They did note that this lack of evidence does not mean lack of effect. The review concluded that there is currently no evidence to support or refute this therapy for patients with Parkinson's disease.

Bath et al. (2000) conducted a Cochrane review to assess the effect of different management strategies for dysphagic stroke patients, including whether therapy improves swallowing and clinical outcome. Six studies were identified that assessed feeding and swallowing treatment strategies in stroke patients, with two studies that assessed the effect of swallowing therapy. These two trials indicated that formal swallowing therapy was associated with a nonsignificant reduction in end-of-trial dysphagia as compared to standard of care. It was noted by the authors that too few studies have been performed involving too few patients. The review concluded that further research is required to assess how and when patients are fed, and the effect of swallowing or drug therapy on dysphagia.

Professional Societies/Organizations

The American Gastroenterological Association (AGA) published a technical review on management of oropharyngeal dysphagia (Cook and Kahrilas, 1999). They note that, "the literature provides reasonable evidence of the plausibility of swallowing therapy but minimal evidence of efficacy. Nonetheless, although no hard evidence supports its efficacy, the available data are inconclusive and swallowing therapy has not been proven ineffective." The AGA review recommends that swallowing therapy should be used based on the current weight of opinion, combined with convincing demonstration of biological plausibility for specific techniques and the consistency of low-grade evidence. The review also notes that large-scale randomized, controlled trials are needed to clarify the current recommendations.

The American College of Chest Physicians (ACCP) published evidenced-based clinical practice guidelines regarding cough and aspiration of food and liquids due to oral-pharyngeal dysphagia (Smith Hammond and Goldstein, 2006). The guidelines note that the treatment of dysphagic patients by a multidisciplinary team, including early evaluation by a speech-language pathologist, is associated with improved outcomes. The ACCP also notes that, "Effective clinical interventions such as the use of compensatory swallowing strategies and the alteration of food consistencies can be based on the results of instrumental swallowing studies."

Swallowing/Feeding Therapy for Infants and Children

Strategies that are used with adults are often difficult to teach to children. Therapies directed toward strengthening of swallowing musculature may be useful for children with a swallowing or feeding disorder due to an underlying medical condition (Rudolph, 2002). Feeding therapy for infants and children may include the following strategies (Arvedson, 1998):

- Position and posture changes: Trunk and head control are closely related to development of oral-motor skills. In particular, children with cerebral palsy and accompanying motor deficits frequently have poor head control and poor trunk stability. Position changes need to be monitored closely for changes over time.
- Changes in food and liquid attributes: These attributes may include, but are not limited to: volume, consistency, temperature and taste.
- Oral-motor and swallow therapies: These procedures are focused on developmental stages with goals to increase the range of textures children can handle in their diets. Oral-motor treatment can include direct exercises of the oral mechanism. Oral-motor treatment may also benefit non-oral feeders. Development of swallowing skills may have a positive effect on the process of swallowing saliva. The therapist can guide and direct caregivers to carry out an oral stimulation.
- Pacing of feedings: Pacing is a technique that regulates the time interval between bites or swallows. This may minimize the risk of aspiration. Some children may need a longer time to swallow.
- Changing of utensils: The food bolus size can be controlled through spoons of different shapes and sizes. Occupational therapists may recommend adaptive equipment and utensils.

Food aversion may be present without an underlying medical condition. Food aversion may also include food selectivity. This may be demonstrated by consumption of a limited variety of food items and the rejection of other items. If needed, behavioral therapy may be used to overcome this condition. Therapy provided for children with these conditions is considered behavioral and training in nature.

Prerequisites for oral feeding attempts for infants and young children include (Arvedson 1998):

- cardiopulmonary stability
- alert, calm state

- in young infants, demonstration of rooting responses and adequate nonnutritive sucking
- appetite or observable interest in eating

Specialized feeding techniques that are used for feeding infants with cleft lip and/or palate have been developed to overcome the lack of negative pressure developed during sucking; these strategies may include (ACPA, 2004):

- cross-cutting fissured nipples
- squeezing a soft bottle to help with the flow of milk
- pumping breast to deliver breast milk via bottle

Literature Review: A cleft palate will prevent the infant from creating the negative pressure necessary to feed and may also lead to breathing problems during feeding. A Cochrane review (Glenny, et al., 2004) was performed with the purpose of assessing the effects of feeding interventions for babies with cleft lip and/or palate on growth, development and parental satisfaction. The study found that there is little research evidence with regard to the most effective feeding intervention for growth, development and parental satisfaction. It was noted that squeezable bottles appear easier to use than rigid feeding bottles for babies with cleft lip and/or cleft palate, and there is weak evidence that breast-feeding is better than spoon-feeding following cleft lip surgery. The authors note that further large, high-quality, randomized controlled trials with developmental and behavioral outcomes measured into childhood are needed to assess the effectiveness of feeding aids and support for babies with clefts of the lip, palate, or lips and palate.

Electrical Stimulation for Dysphagia

Electrical stimulation has been proposed as a treatment for dysphagia. This may involve either direct electrical stimulation of the oral structure, or transcutaneous stimulation of the throat musculature. It appears the goal of the therapy is to stimulate and re-educate the neuromuscular pathways involved in swallowing (Hayes, 2006).

U.S. Food and Drug Administration (FDA): An electrical stimulation device, VitalStim[®] (Chattanooga Group, Hixson, TN) was developed for the treatment of dysphagia. It was granted 510(k) premarket approval by the U.S. Food and Drug Administration (FDA) in 2001. It is classified as a Class II device by the FDA, and the listed indication for use is: muscle re-education by application of external stimulation to the muscles necessary for pharyngeal contraction.

Literature Review: Freed et al. (2001) conducted a nonrandomized, controlled study comparing electrical stimulation to tactile thermal stimulation. One hundred and ten stroke patients with swallowing disorder were enrolled, with 99 completing treatment. Electrical stimulation was applied through transcutaneous electrodes placed on the neck. It was noted that the electrical stimulation group was treated for a longer period of time than the tactile thermal stimulation group. For both groups, follow-up was based on medical records (for readmission) or consultation with the patient, family, physician or nursing home therapist for up to three years. It was noted that there was not a systematic method of data collection or analysis and that follow-up was not performed with all patients. It was noted that both sets of patients showed improvement in swallow scores. In a critical appraisal of this study (Coyle, 2002) it is noted that “perhaps a more valid comparison might have been comparing ES (electrical stimulation) to conventional therapy, consisting of combinations of procedures routinely used in clinics for similar patients.” It is also noted by Coyle that “although electrical stimulation may be determined at some point to have merit in the management of neurogenic dysphagia, the present study does not substantiate its effectiveness.”

Leelamanit et al. (2002) conducted a prospective study to test the hypothesis that synchronous contraction of the thyrohyoid muscle by electrical stimulation during swallowing would improve dysphagia. Twenty-three patients with moderate-to-severe degree of dysphagia resulting from reduced laryngeal elevation were treated with electrical stimulation. The synchronized electrical stimulator was developed by the authors in their laboratory and was used in this study. Treatment was provided daily for four hours until criteria for improved swallow were fulfilled or other intervention was deemed necessary. Follow-up was performed monthly. It was noted that of the 23 patients, 20 showed improvement. Six patients who had achieved improved swallow criteria relapsed at 2–9 months. The authors note that this is a preliminary study of this treatment and that long-term follow-up is needed in a larger group of patients with reduced laryngeal elevation.

Blumenfeld et al. (2006) conducted a nonconcurrent cohort study for the purpose of evaluating the efficacy of electrical stimulation in treating patients with dysphagia and aspiration. The charts of 40 patients undergoing electrical stimulation and 40 patients who underwent traditional dysphagia therapy were retrospectively evaluated. A swallow severity scale was used to compare pre- and post-therapy treatment success. The swallow severity scale improved from 0.50 to 1.48 in the dysphagia therapy group ($P < 0.05$) and from 0.28 to 3.23 in the electrical stimulation group ($p < 0.001$). After adjustments were made for confounding factors, the study noted that patients receiving electrical stimulation appeared to do better with regard to improvement in their swallow function than those receiving dysphagia therapy ($p = 0.003$). The authors concluded that, "the results of this nonconcurrent cohort study suggest that dysphagia therapy with transcutaneous electrical stimulation is superior to traditional dysphagia therapy alone in individuals in a long-term acute care facility." The study acknowledged that, "these results must be confirmed with a prospective, randomized, placebo-controlled, clinical trial in individuals of varying disease severity and rehabilitation potential."

Kiger et al. (2006) conducted a study to compare the outcomes using VitalStim therapy to outcomes using traditional swallowing therapy for deglutition disorders. The study included 22 patients who were divided into an experimental group who received treatment with VitalStim and a control group who received traditional swallowing therapy. Outcomes were analyzed for changes in oral and pharyngeal phase dysphagia severity, dietary consistency restrictions and progression from nonoral to oral intake. The results of the study indicated that the control group made more improvement in the oral phase than the experimental group; however, these results were not statistically significant ($p \geq 2.307$). Regarding diet consistency advancement, it was noted that subjects in both groups were identified as having diet consistency advancement, no change or a more restrictive diet/liquid consistency. The results for this measure were not statistically significant ($p \geq 1.0526$). In relation to the measure of improvement, to evaluate those patients who were initially determined to have no oral intake but improved to oral intake following intervention, the results were statistically not significant ($p \geq 0.0314$). The authors concluded that the results of the study did not show a statistically significant difference in outcomes between the experimental and control groups.

Suiter et al. (2006) conducted a study to determine if neuromuscular electrical stimulation (NMES) therapy applied to the submental muscles' increased myoelectric activity. The authors note that while NMES has been proposed as a treatment for electrical stimulation, little is known regarding the effects of NMES on the specific biomechanical aspects of the pharyngeal swallow. The study included eight subjects who underwent an AB or BA design. The subjects received one-hour NMES treatments during the B conditions and no treatment was rendered during the A condition. The results indicated that seven of the eight subjects exhibited insignificant gains in myoelectric activity of the submental muscles following NMES. The authors concluded that, "Therefore, the benefit of NMES to the submental muscles with the goal of improving the pharyngeal swallow is not supported. Additional research is needed to determine if, how, and why NMES applied to the submental muscles affects the biomechanical aspects of both the normal and disordered pharyngeal swallow."

Carnaby-Mann and Crary (2007) conducted a meta-analysis to evaluate the effect of transcutaneous NMES on swallowing rehabilitation. Seven studies met the criteria and were included in the review. The selection criteria included published or unpublished, randomized and quasi-experimental clinical trials in which a measurable dependent variable was included. The seven studies included a total of 255 patients with dysphagia due to multiple etiologies. Two of the studies were controlled studies, with 103 patients in treatment group and 76 in the control group. The remaining five trials utilized a before-after design, with 76 patients receiving treatment. Therapeutic outcome was evaluated using various methods that included swallowing scale, weight gain, functional eating, residue on a swallowing x-ray study, or laryngeal elevation. The treatment with NMES was provided over a variable period of one to 24 weeks, with a number of total treatment sessions varying across the studies. It was also noted that the NMES electrode placement was not detailed in two of the seven studies. A significant summary effect size was identified for the application of NMES for swallowing ($p < .001$). The heterogeneity was significant for the combined trials ($p < .10$). When two outlier trials were removed, the heterogeneity was no longer significant ($p < .08$). The best-evidence synthesis demonstrated indicative findings in favor of NMES for swallowing. The authors concluded that, "This preliminary meta-analysis revealed a small but significant summary effect size for transcutaneous NMES for swallowing." However, the authors note that, "because of the small number of studies and low methodological grading for these studies, caution should be taken in interpreting this finding." In addition, they note that, "further independent trials with rigorously controlled designs and intent-to-treat analyses are needed to establish whether NMES for swallowing has greater efficacy than traditional swallowing treatments alone."

Ludlow et al. (2007) conducted a study to test two hypotheses regarding the effect of using surface electrical stimulation in chronic pharyngeal dysphagia. The two hypotheses being tested were: 1) that stimulation lowered the hyoid bone and/or larynx when applied at rest; and 2) that stimulation increased aspiration, penetration or pharyngeal pooling during swallowing. The authors note that while stimulation has received increased attention as an option for treatment of dysphagia, not much is known regarding the effects of this treatment on swallowing physiology. Eleven participants were included who had chronic long-standing dysphagia. The underlying cause of the disorder included: either subsequent to cerebral vascular accident (CVA); post-craniotomy for a benign tumor or post-traumatic brain injury (TBI); and one patient with a chronic progressive neurological disease—Parkinson's disease. Electrodes were placed on the skin overlying the submandibular and laryngeal regions. Maximum tolerated levels of electrical stimulation were applied while patients held their mouths closed at rest. Video fluoroscopy was used to measure hyoid movements in the superior-inferior and anterior-posterior dimensions and the subglottic air column positions while the stimulation was on and off. The frequency of aspiration, penetration, pooling and esophageal entry was measured by speech pathologists blinded to the condition. The results noted only significant ($p=0.0175$) hyoid depression occurred during stimulation at rest; aspiration and pooling were significantly reduced only with low sensory threshold levels of stimulation ($p=0.025$) and not during the maximum levels of electrical stimulation. The authors note that the patients who had reduced aspiration and penetration during swallowing with stimulation had greater hyoid depression during stimulation and propose that stimulation may have acted to resist patients' hyoid elevation during swallowing. The study is a first step in developing physiological understanding of the effects of surface electrical stimulation in treatment of dysphagia. It is noted that before this is used in therapy, "improved understanding of its immediate effects should be gained in the presence of specific types of swallowing difficulties before it is applied widely to a variety of patients regardless of their risk of aspiration with hyoid lowering."

A study by Humbert et al. (2007) of 20 healthy subjects looked at the physiological effects of electrical stimulation on neck muscles and swallowing. The study examined if movements induced by surface stimulation using other placements of electrodes differed and if lowering the hyo-laryngeal complex by surface electrical stimulation interfered with swallowing in healthy adults. Ten bipolar surface electrode placements overlying the submental laryngeal regions were tested. Recordings with videofluoroscopy were performed to measure hyoid bone and subglottic air column (laryngeal) movements from resting position and while swallowing 5 ml of liquid barium with and without stimulation. The NIH-Swallowing Safety Scale (NIH-SSS) was utilized for the videofluoroscopic recordings of swallows. Significant laryngeal and hyoid descent occurred with stimulation at rest ($p<0.0001$). Significant reductions in both the larynx and hyoid bone peak elevation occurred during stimulated swallows ($p\leq 0.01$). The stimulated swallows were also judged to be less safe than non-stimulated swallows using the NIH-SSS ($p=0.0275$). The authors noted that since surface electrical stimulation reduces hyo-laryngeal elevation during swallowing in normal volunteers, the findings propose that surface electrical stimulation will reduce elevation during swallowing therapy for dysphagia.

Bulow et al. (2008) conducted randomized trial to evaluate and compare the outcome of NMES as compared to traditional swallowing therapy (TT) in stroke patients. The study included 25 patients who were randomized to NMES ($n=12$) and to TT ($n=13$). Pre- and post-trial measures included videoradiographic swallowing evaluation, nutritional status, oral motor function test, and a visual analog scale (VAS) for self-evaluation of complaints. Fifteen therapy sessions were rendered to all patients by a speech-language therapist trained in dysphagia management. There were statistically significant positive therapy effects for both groups combined but there were no statistically significant difference in therapy effect between the groups. The correlation between the different measurements was found to be low. The patient's subjective experience of improvement did not correlate with objective videography, the authors note that a false-positive perception of improvement may lead to serious swallowing complications, such as choking. At least of two of the patients in the study were treated for severe aspiration pneumonia a couple of months after the study (randomized for NMES). It was proposed that since these patients had positive post-treatment VAS score, felt they had recovered from swallowing difficulties and did not follow the diet modification recommendation.

There is insufficient evidence in the published, peer-reviewed scientific literature to conclude that electrical stimulation is effective in the treatment of dysphagia. Well-designed, randomized, controlled clinical trials are needed to demonstrate the effect and the clinical benefit of electrical stimulation for this condition.

Professional Societies/Organizations: The American College of Chest Physicians (ACCP) guidelines regarding cough and aspiration of food and liquids due to oral-pharyngeal dysphagia include a recommendation regarding electrical stimulation "for patients with muscular weakness during swallowing, muscle strength

training, with or without electromyographic biofeedback, and electrical stimulation treatment of the swallowing musculature are promising techniques, but cannot be recommended at this time until further work in larger populations is performed” (Smith Hammond and Goldstein, 2006).

Summary

Swallowing and feeding disorders may be a result of a wide variety of medical conditions. Swallowing therapy has been a standard of care that is used to treat this condition. Children with feeding disorders due to an underlying medical condition may be assisted with feeding therapy. Treatment of food aversion is considered behavioral and training in nature and not medically necessary. The goals of swallowing/feeding therapy include reducing aspiration, improving the ability to eat and swallow, and optimizing the nutritional status.

Coding/Billing Information

Note: This list of codes may not be all-inclusive.

Covered when medically necessary:

CPT®* Codes	Description
92526	Treatment of swallowing dysfunction and/or oral function for feeding

HCPCS Codes	Description
	No specific codes

ICD-9-CM Diagnosis Codes	Description
438.82	Other late effects of cerebrovascular disease, dysphagia
783.3	Feeding difficulties and mismanagement
787.2	Dysphagia

Experimental/Investigational/Unproven/Not Covered:

CPT* Codes	Description
	No specific codes
97014†	Application of a modality to one or more areas; electrical stimulation (unattended)
97032†	Application of a modality to one or more areas; electrical stimulation (manual), each 15 minutes

HCPCS Codes	Description
G0283†	Electrical stimulation (unattended), to one or more areas for indication(s) other than wound care, as part of a therapy plan of care

ICD-9-CM Diagnosis Codes	Description
	Multiple/varied

†**Note:** Experimental, investigational or unproven and not covered when used to report electrical stimulation for swallowing/feeding disorders.

*Current Procedural Terminology (CPT®) © 2007 American Medical Association: Chicago, IL.

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