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Coverage Policy

Under many benefit plans, 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. Swallowing/feeding therapy is considered a form of speech therapy.

Outpatient speech therapy is the most medically appropriate setting for these services unless the individual independently meets coverage criteria for a different level of care.

Many benefit plans have exclusion language that impacts coverage of speech therapy, including any or all of the following:
• A maximum allowable speech therapy benefit for duration of treatment or number of visits. When this is present and the maximum allowable benefit is exhausted, coverage will no longer be provided even if the medical necessity criteria described below are met.

• Specific coverage exclusions for rehabilitative services for learning disabilities, developmental delays, autism, mental retardation and/or for treatments which are not restorative in nature

• Specific coverage exclusions for behavioral training/treatment or services that are considered educational and/or training in nature. In benefit plans where this exclusion is present, services that are considered training such as voice therapy for conditions such as voice disorders without evidence of an anatomic abnormality, neurological condition, or injury would not be covered.

• Specific coverage exclusions for myofunctional therapy for dysfluency (e.g., stuttering, spastic dysphonia or other involuntarily acted conditions) or functional articulation disorders (e.g., tongue thrust, lisp, verbal apraxia)

• Specific coverage exclusions for maintenance or preventive care consisting of routine, long-term, or non-medically necessary care provided to prevent recurrences or to maintain the member’s current status

• Under many benefit plans formerly administered by Great-West Healthcare, speech therapy is only covered for the restoration of speech due to impairment following acute injuries, diseases or conditions when the speech therapy services are expected to result in significant clinical improvement within two months.

If coverage is available for speech therapy, the following conditions of coverage apply.

Evaluation

Cigna covers an evaluation by an appropriate healthcare provider as medically necessary for EITHER of the following:

• assessment of a speech/language/voice impairment
• assessment of a swallowing/feeding disorder

Speech/Language Therapy

Cigna covers as medically necessary EITHER of the following:

• A prescribed course of speech therapy by an appropriate healthcare provider for the treatment of a severe impairment of speech/language and an evaluation has been completed by a certified speech-language pathologist that includes age-appropriate standardized tests that measure the extent of the impairment, performance deviation, and language and pragmatic skills assessment levels.
• A prescribed course of voice therapy by an appropriate healthcare provider for a significant voice disorder that is the result of anatomic abnormality, neurological condition, injury (e.g., vocal nodules or polyps, vocal cord paresis or paralysis, paradoxical vocal cord motion) or provided after vocal cord surgery.

When ALL of the following criteria are met:

• The treatment being recommended has the support of the treating physician.
• The therapy being ordered requires the one-to-one intervention and supervision of a speech-language pathologist.
• The therapy plan includes specific tests and measures that will be used to document significant progress on a regular basis, not to exceed three months.
• Meaningful improvement is expected from the therapy.
• The therapy is individualized, and there is documentation outlining quantifiable, attainable short- and long-term treatment goals.
• For a child, the treatment plan includes active participation/involvement of a parent or guardian.

Cigna covers continuation of speech therapy visits as medically necessary when ALL of the following criteria are met:

• The criteria listed above are met.
• There is documented progress toward the quantifiable, attainable short- and long-term treatment goals.

Swallowing/Feeding Therapy

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.

Not Covered

Cigna does not cover speech, voice therapy, or swallowing/feeding therapy in ANY of the following situations, as it is excluded from many benefit plans and considered not medically necessary when used for these purposes:

• any computer-based learning program for speech or voice training purposes
• school speech programs
• speech, voice therapy, or swallowing/feeding therapy that duplicates services already being provided as part of an authorized therapy program through another therapy discipline (e.g., occupational therapy)
• group speech or voice therapy (because it is not one-on-one, individualized to the specific person’s needs)
• maintenance programs of routine, repetitive drills/exercises that do not require the skills of a speech-language therapist and that can be reinforced by the individual or caregiver
• vocational rehabilitation programs and any programs with the primary goal of returning an individual to work
• therapy or treatment provided to prevent or slow deterioration in function or prevent reoccurrences
• therapy or treatment intended to improve or maintain general physical condition
• therapy or treatment provided to improve or enhance job, school or recreational performance
• long-term rehabilitative services when significant therapeutic improvement is not expected
• swallowing/feeding therapy for food aversions

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

General Background

Speech therapy is the treatment of defects and disorders of speech and language disorders. Prior to the initiation of speech therapy, a comprehensive evaluation of the patient and his or her speech and language
potential is generally required before a full treatment plan is formulated. As part of the evaluation, standardized assessment tests should be used for evaluations to identify and quantify impairment and may include the following (Kortte and Palmer, 2002):

- Receptive-Expressive Emergent Language Scale (REEL): infants (birth to three years)
- Test of Language Development (TOLD): school-age children
- Porch Index of Communication Ability (PICA): adults
- Boston Diagnostic Aphasia Examination: adults
- Peabody Picture Vocabulary Test (PPVT): for all ages

For the child with a speech delay, the speech/language evaluation may demonstrate that the potential exists that, through speech therapy, the child will reach an age-appropriate level of speech. Some situations for which speech therapy may be appropriate in the prelingual child include: following documented central nervous system anoxia and/or long-term intubation, chronic otitis media, or after cochlear implant or cleft palate surgery.

A hearing test may also be conducted to determine if the child is experiencing mild hearing loss as a result of transient or persistent ear infections or allergies. Should these conditions be identified, then medical management and monitoring should be used to minimize the effects that this could have on future language learning. Comorbid psychiatric disorders, environmental deprivation, pervasive developmental disorders, intellectual disability, autism and selective mutism should all be considered in cases of language delay (Koyama, et al., 2009).

Speech therapy services should be individualized to the specific communication needs of the patients. It should be provided one-to-one by a speech-language pathologist educated in the assessment of speech and language development, the treatment of language and speech disorders. A speech-language pathologist can offer specific strategies, exercises and activities to regain function communication abilities (Kortte and Palmer, 2002).

Documentation of the proposed treatment plan should include all of the following:

- findings of the speech evaluation, including motor and expressive results
- short- and long-term measurable goals, with expectations for progress
- specific treatment techniques and/or exercises to be used during this treatment
- determination of how the goals will be measured and reported at regular intervals, not to exceed three months
- expected duration of therapy for goals to be met
- documented strategy to transition this supervised therapy to a patient-administered or caregiver-directed maintenance program

Before continuing speech/language services, the results of these patient-specific measures goals should demonstrate that the individual is consistently improving and that a plateau (i.e., where no additional meaningful improvements are being measured or are expected to occur) has not been reached. There should be documented progress toward the measurable goals for additional visits to be considered medically necessary. Once the individual has reached their goals or a therapeutic plateau has been reached, then ongoing therapy becomes maintenance in nature.

The use of group therapy is not one-on-one, individualized to the specific patient needs. Services that are provided by speech therapists and occupational therapists may overlap (Michaud, et al., 2004/2011). Speech therapy that is being provided as part of an occupational training program is considered duplicative in nature.

A speech-language pathologist (SLP) has a master’s or doctoral degree and is licensed, if applicable, as a speech-language pathologist by the state in which he or she is practicing. The SLP possesses a Certificate of Clinical Competence (CCC) from the American Speech-Language-Hearing Association (ASHA) or has met all the educational requirements leading to the CCC, and is in the clinical fellowship (CF) year or is otherwise eligible for the CCC (American Speech-Language-Hearing Association, 2011).

Speech and Language Impairments
Language impairment is the inability to comprehend and/or appropriately use language. The impairment may involve the form of language (i.e., phonology, morphology, and syntax), the content of language (i.e., semantics), the function of language in communication (i.e., pragmatics), or any combination of the above. The terms language or speech impairment do not include dialectal differences, auditory processing disorders or selective mutism. Language is the brain's use of symbols for communication. Language is the unique human ability to communicate through symbols, whether spoken or written language, Braille, musical notation, or most forms of sign language. Language is distinct from speech, which is the verbal expression of language.

Speech and language impairments can result from a variety of local, systemic and neurological conditions. Examples of local impairments are injury or localized disease of the vocal cords; tumors or growths that cause swallowing and speech difficulty; and congenital cleft lip or cleft palate. Neurological causes of speech and language problems include stroke and a variety of conditions, such as multiple sclerosis. Speech and language impairments include may include the following conditions (Kortte and Palmer, 2002):

- **Aphasia:** This disorder involves the expression of language, the comprehension of language, or both. It can be classified into specific syndromes according to the ability to produce, understand and repeat language. The ability to produce language is assessed in terms of fluency, which is defined as the rate of speech and amount of effort in producing speech. There are several syndromes of aphasia and each is associated with a particular set of language capabilities and disabilities. Global aphasia is when both expressive and receptive problems are present. These include:
  - Broca's: This syndrome is characterized with nonfluent speech, intact comprehension and poor repetition skills.
  - Wernicke's: This syndrome is characterized with fluent speech, poor comprehension and poor repetition skills.
  - Conduction: This syndrome is characterized by fluent speech, intact comprehension and poor repetition skills.
  - Transcortical motor: This syndrome is characterized with nonfluent speech, intact comprehension and intact repetition skills.
  - Transcortical sensory: This syndrome is characterized by fluent speech, poor comprehension and intact repetition skills.
  - Anomic: This syndrome is characterized fluent speech, and intact comprehension and repetition skills.

- **Aphonia:** This is the total loss of speech sounds.

- **Apraxia/dyspraxia:** This is the inability or difficulty to form words or speak, despite the ability to use the oral and facial muscles to make sounds.

- **Dysarthria:** With this impairment, there is an impairment or clumsiness in the uttering of words due to diseases that affect the oral, lingual or pharyngeal muscles; speech may be difficult to understand, but the ability to communicate is present.

- **Dysphasia:** impairment of speech resulting from a brain lesion, stroke or neurodevelopmental disorder

- **Stuttering:** disruption in the fluency of speech; affected persons repeat letters or syllables, pause or hesitate abnormally, or fragment words when attempting to speak.

### Communication Disorders in Children

Language tends to develop in a predictable pattern in children. The acquisition of language and communication goes form preverbal to verbal skills and the comprehension of language precedes spoken words. Assessment of language should be an element of every well-child visit. A basic classification system recognizes the following four types of communication disorders (Simms, 2007; Simms, et al., 2011):

- **Expressive language disorder**—criteria for this condition include:
  - Scores obtained from standardized individually administered measures of expressive language development are substantially below those obtained for standardized measures of both nonverbal intellectual capacity and receptive language development. The disturbance may be manifest clinically by symptoms that include having a markedly limited vocabulary, making errors in tense, or having difficulty recalling words or producing sentences with developmentally appropriate length or complexity.
  - Difficulties with expressive language interfere with academic or occupational achievement or with social communication.
- Criteria are not met for mixed receptive-expressive language disorder or a pervasive developmental disorder.
- If an intellectual disability is present, a speech-motor or sensory deficit, or environmental deprivation is present, the language difficulties are in excess of those usually associated with these problems.

- Mixed receptive language disorder—criteria for this condition include:
  - Scores obtained from a battery of standardized individually administered measures of both receptive and expressive language development are substantially below those obtained from standardized measures of nonverbal intellectual capacity. Symptoms include those for expressive language disorder as well as difficulty understanding words, sentences, or specific types of words, such as spatial term.
  - Difficulties significantly interfere with academic or occupational achievement or with social communication.
  - Criteria are not met for a pervasive developmental disorder.
  - If an intellectual disability is present, a speech-motor or sensory deficit, or environmental deprivation is present, the language difficulties are in excess of those usually associated with these problems.

- Phonologic disorder (formerly referred to as developmental articulation disorder)—criteria for this condition include:
  - Failure to use developmentally expected speech sounds that are appropriate for age and dialect. This includes errors in sound production, use, representation, or organization such as, but not limited to, substitutions of one sound for another or omissions of sounds (e.g., final consonants).
  - The difficulties in speech sound production interfere with academic or occupational achievement or with social communication.
  - If an intellectual disability is present, a speech-motor or sensory deficit, or environmental deprivation is present, the language difficulties are in excess of those usually associated with these problems.

- Stuttering—criteria for this condition include:
  - Disturbance in the normal fluency and time patterning of speech that is inappropriate for the individuals’ age and is characterized by frequent occurrences of one or more of the following:
    - sound and syllable repetitions
    - sound prolongations
    - interjections
    - broken words (e.g., pauses within a word)
    - audible or silent blocking (e.g., filled or unfilled pauses in speech)
    - circumlocutions (e.g., word substitutions to avoid problematic words)
    - words produced with an excess of physical tension
    - monosyllabic whole-word repetitions (e.g., “I-I-I-I see him”)

Communication disorders are demonstrated by a significant discrepancy between language and nonverbal intellectual development; although no specific cutoff criteria are provided (Simms, 2007). Within these classifications, providers are likely to see children with a wide range of language and communication difficulties. Mixed receptive-expressive language disorder may also be referred to as specific language impairment or developmental dysphasias or developmental language disorder.

**Pragmatic Language Disorder:** This disorder goes beyond the basic understanding of words and grammar and involves the use of language in social settings. Children who have this disorder may have difficulty comprehending the social context of conversations. It may be considered in the context of specific language impairment but is also seen as a symptom of other many other disorders, including: autism and pervasive developmental disorder, Asperger’s syndrome, nonverbal learning disability and right-hemisphere brain damage. It is also recognized by some providers as a distinctive developmental language disorder (Simms, 2007).

**Articulation Disorders/Phonologic Disorders:** In this condition speech problems that interfere with sound articulation are usually considered a phonologic impairment. It has been noted that approximately 7.5% of three-to eleven-year old children exhibit significant speech sound distortions. In most circumstances these children babble at the normal age, and produce a wide range of vowel and consonant sound. As they progress they typically omit, substitute, or reduce consonants and clusters of sounds. These children may be unintelligible (Simms, 2007).
**Dysarthria/Motor Speech Disorder:** These disorders involve damage to the central or peripheral neurological mechanism. They may be caused by neuromotor disorders, such as cerebral palsy, muscular dystrophy, myopathy, or facial palsy. The resulting dysarthria may affect both speech and nonspeech functions (e.g., smiling, chewing, swallowing). There may be a lack of strength and muscular control manifests as slurring of words and distorted vowels and consonants and slow labored speech (Simms, 2007).

**Verbal Apraxia:** This disorder is characterized by inconsistent distortion of speech sounds. It may be the result of difficulty in planning and coordinating movements for speech production. In this condition the same word may be pronounced differently each time. There may be struggling behaviors and searching for the capability to produce the word. The apraxia may be limited to oral motor function, or it may be a more generalized problem affecting fine and/or gross motor coordination (Simms, et al., 2011).

**Late Talker Syndrome:** This condition may also be referred with terms: maturational delay or late bloomer. Children with delayed expressive language development, with no evidence of motor speech disorder and whose receptive language abilities are normal may have a maturational expressive language delay. This may be considered to a normal variant of development. It is a diagnosis that is generally made by exclusion, when other causes are ruled out. It is thought to be more common in boys than girls and tends to run in families. After these children start talking they continue to do well and there appears to be little long-term risk of speech, language or learning impairment. Little scientific research has been conducted on this condition (Koyama, et al., 2009).

**Otitis Media:** Otitis media with effusion (OME) is the presence of fluid in the middle ear without signs or symptoms of acute ear infection. Persistent middle-ear fluid from OME may result in decreased mobility of the tympanic membrane and serve as a barrier to sound conduction. It is commonly diagnosed between six and 30 months old. Joint guidelines from the (American Academy of Family Physicians [AAFP], American Academy of Otolaryngology-Head and Neck Surgery [AAO-HNS] and American Academy of Pediatrics [AAP], 2004) on otitis media with effusion note that a hearing testing is recommended when OME persists for three months or longer or at any time that language delay, learning problems, or a significant hearing loss is suspected. The guidelines note that conductive hearing loss often accompanies OME and may adversely affect binaural processing, sound localization, and speech perception in noise. In addition it is noted that while hearing loss caused by OME may impair early language acquisition, the child's home environment has a greater impact on outcomes. Randomized trials suggest that there is no impact on children with OME who are not at risk as identified by screening or surveillance (AAFP/AAO-HNS/AAP (2004).

The AAFP/AAO-HNS/AAP (2004) guidelines recommend that language testing should be conducted for children with hearing loss (pure-tone average more than 20-dB HL on comprehensive audiometric evaluation). Young children with speech and language delays during the preschool years are at risk for continued communication problems and later delays in reading and writing. Interventions may be needed to improve communication and other functional outcomes for children with histories of OME. Children's speech and language can be tested at ages six to 36 months by direct engagement of a child and by interviewing the parent with the Early Language Milestone Scale. In addition the child's parent or caregiver can be interviewed with the MacArthur Communicative Development Inventory and the Language Development Survey. The Denver Developmental Screening Test II can be used to screen general development including speech and language in older children. Comprehensive speech and language evaluation is recommended for children who fail testing or whenever the child's parent or caregiver expresses concern (AAFP/AAO-HNS/AAP, 2004).

**Autism Spectrum Disorders (ASD)/Pervasive Developmental Disorders (PDD):** The communication problems of autism spectrum disorders (ASD) and pervasive developmental disorders (PDD) vary, depending upon the intellectual and social development of the individual. Some patients may be unable to speak, whereas others may have rich vocabularies and are able to talk about topics of interest in great depth (National Institute on Deafness and Other Communication Disorders [NIDCD], 2012). Although there is a variation, the majority of individuals with ASD will have minimal or no problem with pronunciation; however, most will have difficulty effectively using language (NIDCD, 2012).

When ASD or some other developmental disability is suspected, an assessment by speech-language pathologist may be part of the comprehensive evaluation. It has been noted in the literature that there is no single approach that is best for all individuals with ASD (NIDCD, 2012). There are many different approaches to improve communication skills. The best treatment program begins early, during the preschool years, and is
tailored to the child’s age and interests. The program should address both the child’s behavior and communication skills and offer regular reinforcement of positive actions. Most children with ASD respond well to highly structured, specialized programs (NIDCD, 2012).

There is much heterogeneity found in the speech, language and communication characteristics of children with ASD. Patterns of language use and behaviors that are often found in children with ASD include (NIDCD, 2012):

- Repetitive or rigid language: includes saying things out of context in conversation or echolalia, where words are repeated over and over
- Uneven language development: progress and development of language and communication skills is uneven. They may have difficulty with pragmatics of language—the system that combines language components in functional and socially appropriate communication
- Poor nonverbal conversation skills: Children may not use gestures, such as pointing at objects and may avoid eye contact.

American Speech-Language-Hearing Association (ASHA) autism practice portal autism notes that treatment for individuals with ASD typically includes (ASHA, 2016):

- setting goals based on assessment data that target the core deficits in ASD and focus on initiating spontaneous communication in functional activities, engaging in reciprocal communication interactions, and generalizing gains across activities, environments, and communication partners;
- using a multimodal communication system (e.g., spoken language, gestures, sign language, picture communication, speech-generating devices [SGDs], and/or written language) that is individualized according to the individual's abilities and the contexts of communication;
- considering family priorities when selecting intervention goals—meaningful outcomes are strongly correlated with communication competence across functional social contexts (e.g., home, school, vocational, and community settings);
- incorporating cultural, linguistic, and personal values and attributes unique to each individual into therapeutic activities;
- using a range of approaches for enhancing communication skills along a continuum from behavioral to developmental;
- using developmental sequences and processes of language development to provide a framework for determining baselines and implications for intervention goals;
- measuring progress using systematic methods to determine whether an individual with ASD is benefiting from a particular treatment program or strategy.

Velopharyngeal insufficiency: The velopharyngeal valve consists of the velum (soft palate) and pharyngeal walls. It directs the transmission of air pressure and sound into the oral cavity (Kummer, 2006). Normal velopharyngeal function results in normal oral resonance, adequate intra-oral air pressure for consonant production, and sufficient breath support for normal utterance length (Kummer, 2006). Velopharyngeal insufficiency occurs when there is an anatomical or structural defect, and is defined as incomplete closure of the velopharynx. This may result in hypernasality, or too much nasal resonance. The condition is often associated with cleft palate. The primary treatment used to manage VPI is surgical (Ruscello, 2008, Kummer, 2006; Rudnick, et al., 2008). Since the condition is due to structural defect or physiological disorder speech therapy is not indicated.

Literature Review
While there are limited clinical trials published regarding the efficacy of speech therapy, there are several systematic reviews published regarding speech and voice therapy.

In an update to a 2000/2010 Cochrane reviews, Brady et al. (2012) reported on a Cochrane review of 39 randomized controlled trials with 2,518 participants that examined the effectiveness of speech and language therapy (SLT) interventions for aphasia following stroke. The authors concluded that there is some evidence of the effectiveness of SLT for people with aphasia following stroke in terms of improved functional communication, receptive and expressive language. The potential benefits of intensive SLT over conventional SLT were confounded by a significantly higher dropout from intensive SLT. More participants also withdrew from social support than SLT interventions. There was insufficient evidence to draw any conclusion regarding the effectiveness of any one specific SLT approach over another.
Herd et al. (2012a) reported on a Cochrane review of three randomized, controlled trials with 63 participants that compared the efficacy of speech and language therapy versus placebo or no intervention for speech and voice problems in patients with Parkinson’s disease. Although improvements in speech impairments were noted in these studies, due to the small number of patients examined, methodological flaws, and the possibility of publication bias, there is insufficient evidence to conclusively support or refute the efficacy of SLT for speech problems in Parkinson’s disease. A large well designed placebo-controlled RCT is needed to demonstrate SLT’s effectiveness in Parkinson’s disease.

Herd et al. (2012b) conducted a Cochrane review to compare the efficacy and effectiveness of novel speech and language therapy (SLT) techniques compared to standard SLT approach to treat Parkinsonian speech problems. The review included six trials involving 159 patients. Due variation in the methods, meta-analysis of the results was not possible. Considering the small number of patients and the methodological flaws in these studies, the authors concluded that there is insufficient evidence to support the use of one form of SLT over another for the treatment of speech problems in individuals with Parkinson’s disease.

Kelly et al. (2010) reported on a Cochrane review of 30 randomized trials, involving 1,840 participants that examined the effectiveness of speech and language therapy (SLT) interventions for aphasia following stroke. The study found that the evidence shows some indication of the effectiveness of SLT for people with aphasia following stroke, especially in relation to functional communication, expressive language and the severity of aphasia. It was noted that there was insufficient evidence to indicate the best approach to delivering speech and language therapy.

Cirrin and Gillam (2008) conducted a systematic review of 21 studies that assess the outcomes of language intervention practices for school age students with spoken language disorder. Eleven of the studies limited participants to children in kindergarten and first grade and there were no studies that focused on students in middle grades or high school. The review noted that there is little research evidenced to guide evidenced-based decisions about treatment options.

Pennington et al. (2004) conducted a Cochrane systematic review of 11 studies to determine the effectiveness of speech language therapy for children with cerebral palsy. Seven studies evaluated treatment rendered to children; four investigated the effects of training for communications partners. There was a wide variation in age, type and severity of cerebral palsy, cognitive and linguistic skills. There were methodological flaws that prevented firm conclusions from being made about the effectiveness of therapy. The maintenance of skill was not investigated thoroughly. The authors noted that further research is needed to investigate the effectiveness of new and established interventions and their acceptability to families.

In 2004, Law et al. reported on a meta-analysis of 25 studies to determine the effectiveness of speech and language interventions for children with primary speech and language delay/disorder. The authors concluded that the results suggest that speech and language therapy is effective for children with phonological or vocabulary difficulties, but there is a lack of evidence that interventions are effective for children with receptive difficulties, and no conclusion could be drawn for the use of expressive syntax interventions. There was also no significant difference found in therapy administered by a professional versus therapy provided by a trained parent, or that group interventions produced better outcomes than individual interventions. The studies did show that using peers with normal language as part of the intervention did have a positive impact on the therapy outcomes.

**Voice Therapy**

Voice therapy is a form of speech therapy used for treatment of voice disorders. Voice disorders, or vocal disorders, can result in a voice that is unpleasant and can impede effective communication. The ability to produce speech is present; it is the voice quality, pitch, resonance or duration that is affected. The cause may be organic or functional. Organic voice disorder may be caused by congenital or acquired anatomic abnormalities. Functional disorders may be caused by emotional or psychological problems but this may lead to anatomic alterations. Voice disorders are generally classified depending on the area of problem—there are several problems areas and may include problems with voice quality, resonance, loudness and pitch (Choi and Zalzal; 2005). Dysphonia and hoarseness are often used interchangeably; however, hoarseness is a symptom of altered voice quality and dysphonia is a diagnosis (Schwartz, et al., 2009).
Voice is produced by vibration of the vocal fold which are a band of smooth muscle tissue that lie opposite each other and are located in the larynx or voice box. Vocal nodules are small benign growths on the vocal cords. They are callous growths that usually form in pairs, one on each vocal fold. They form at the area that receives the most pressure when the folds come together to vibrate. Vocal polyps are benign growth that is similar to vocal nodules but are softer, usually extramucosal while nodules are submucosal. They most often form on only one vocal cord. The voice of individuals with vocal nodules and polyps usually sounds hoarse, low-pitched, and slightly breathy. In general these conditions are diagnosed with a physical examination along with an examination of the vocal cords with laryngoscopy or fiberoptic laryngoscopy performed (National Institute on Deafness and Other Communication Disorders [NIDCD], 2011a).

Vocal cord paralysis occurs when one or both of the vocal cords do not open or close properly. The symptoms can range from mild to life-threatening (NIDCD, 2012c). The condition may be treated with surgery or voice therapy which may include exercises to strengthen the vocal cords or improve breath control during speech. Surgical removal of the vocal cord nodule or polyp may be needed if voice therapy has failed. Since these conditions easily recur following surgery if the vocal misuse continues and other period of voice therapy by a speech-language pathologist after surgery may be indicated (NIDCD, 2011a).

Paradoxical vocal cord motion (PVFM) disorder occurs when the vocal folds adduct during inhalation and/or exhalation, thereby restricting the airway opening (Mather-Schmidt, 2001). This may result in marked inspiratory stridor and wheezing which may lead to the condition being confused with asthma. The treatment involves speech and voice therapy, which are regarded as the primary therapy for PVFM (Hicks, et al., 2008). The therapy may include vocal exercise, relaxation techniques, and proper breath support for speech (AHSA, 2011). The disorder may also be known as paradoxical vocal fold movement disorder, paradoxical vocal cord movement, paradoxical vocal cord dysfunction, episodic paroxysmal laryngospasm.

An evaluation by a speech-pathologist will include assessment of the pitch, loudness, and quality of the person’s voice, and will also assess vocal techniques such as breathing and style of voicing. A voice recording may be made with trial therapy techniques used to test their effectiveness in improving the voice (NIDCD, 2011a). The evaluation for voice disorders should include perceptual, acoustic and aerodynamic analyses. The particular measures that are used in evaluating voice disorders may vary from one SLP to another. For perceptual evaluation, the tests include: GRBAS Scale for Auditory-Perceptual Evaluation Consensus Auditory-Perceptual Evaluation–Voice (CAPE-V).

Therapeutic interventions may include education in how the voice works and good vocal hygiene, physiologic vocal exercises to improve the quality and strength of the voice, and compensatory techniques to optimize vocal function (Ashley, et al., 2006). Voice therapy techniques fall into two main categories (Ruotsalainen, et al., 2009):
- Indirect treatment: these focus on psychosocial aspects such as patient education, auditory training and vocal hygiene programs
- Direct treatment: these techniques focus on mechanical or physical aspects such as yawn-sign method, establishing optimal pitch and laryngeal manipulation

**Literature Review—Voice Therapy:** Speyer (2008) reported on a systematic review regarding the effects of voice therapy. The review included 47 studies of treatment of dysphonia on a functional or organic base without any neurological origin. Review articles, case reports, and articles limited of populations smaller than five subjects were excluded. Overall, the authors found that the impression is that the number of papers is small and many studies have methodological problems. While no conclusion could be made, the review indicated that when statistically significant positive results they appear to be modest in general and the therapy effects in individual patients are varying. Direct voice therapies appear to more effective than indirect therapies.

Ruotsalainen et al. (2007) reported on a Cochrane review that evaluated the effectiveness of interventions to treat functional dysphonia in adults. Functional dysphonia in this review was defined as an impaired voice sound and/or reduced vocal capacity with a possible concomitant diagnosis of minor pathologies of the vocal cords (e.g., nodules, polyps, or edema). The review included six studies with one noted to be of high quality. The conclusion noted that evidence is available for the effectiveness of comprehensive voice therapy comprising both direct and indirect therapy elements; however, larger and methodically better studies are needed with outcome measurements that correlate with treatment objectives.
Professional Societies/Organizations—Voice Therapy: Clinical practice guidelines published by the American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS) for the management of hoarseness (dysphonia) note that “clinicians should advocate voice therapy for patients diagnosed with hoarseness that reduces voice-related quality of life (Schwartz, et al., 2009). The guidelines note that, “A trial of conservative management is typically instituted prior to surgical intervention for most pathologies and may obviate the need for surgery. Many benign soft tissue lesions of the vocal folds are self-limited or reversible. The conservative management strategy indicated depends on the likely underlying etiology but may include voice therapy or rest, smoking cessation, and anti-reflux therapy.”

A technical report from the American Speech-Language-Hearing Association (ASHA) (2005) for the use of voice therapy in the treatment of dysphonia notes that, “research data and expert clinical experience support the use of voice therapy in the management of patients with acute and chronic voice disorders. Voice therapy contributes to increased effectiveness and efficiency in the treatment of voice disorders. When surgery is necessary, adjunctive voice therapy can improve surgical outcomes, prevent additional injury, and limit additional treatment costs.”

Therapy for Swallowing and Feeding Disorders
Difficultly with swallowing is also referred to as dysphagia or 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 phases of swallowing include: oral preparation and oral propulsive, pharyngeal and esophageal (Palmer, 2000). Dysphagia is classified according to which phase of swallowing is affected (Palmer, 2000).

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 (Derkay, et al., 1998). 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.

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], 2007). 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. 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), also referred to as modified barium swallow, is the gold standard for evaluating the mechanism of swallowing (Palmer, 2000). This test is usually performed jointly by a 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). Additional diagnostic testing that may be employed includes (Palmer, 2000; Darrow and Harley, 1998): esophagoscopy; esophageal manometry and pH probe studies; electromyography; fibroptic endoscopic examination of swallowing (FEES) and, ultrasound imaging.

Swallowing and feeding disorders in children and infants are complex and may have multiple causes. Underlying medical conditions that may cause dysphagia may include, but are not limited to (Palmer, 2000; Rudolph, et al., 2002):

- neurological disorders (e.g., cerebral palsy)
- disorders affecting suck-swallow-breathing coordination (e.g., bronchopulmonary dysplasia)
- structural lesions (e.g., neoplasm)
- connective tissue disease (e.g., muscular dystrophy)
- iatrogenic causes (e.g., surgical resection, medications)
- anatomic or congenital abnormalities (e.g., cleft lip and/or palate)

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, et al., 1999).

The specific strategy that is utilized will depend on the dysfunction that is present. Swallowing therapy strategies may include:

- 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.

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.

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.

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, 2007):

• 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—Swallowing/Feeding Therapy: There are limited published clinical trials that assess the specific treatments for dysphagia and the effect of the treatments. Geeganage et al. (2012) published an update to a previous Cochrane review to assess the effect of different management strategies for dysphagic stroke patients (Bath, et al., 2000). The review included 18 studies that assessed swallowing therapy for dysphagia and involved 967 patients. A variety of stimulatory techniques were included in these studies: acupuncture, behavioral therapy, drug therapy, neuromuscular electrical stimulation, pharyngeal electrical stimulation, physical stimulation, transcranial direct current stimulation and transcranial magnetic stimulation (TMS). The authors found that none of the techniques showed, individually, significant effects on functional outcome (primary outcome) or case fatality. The authors concluded that there remains insufficient data on the effect of swallowing therapy, on functional outcome and death in dysphagic patients with acute or sub-acute stroke. Further research is needed to discover which components of swallowing therapy are beneficial.

Morgan et al. (2012) reported on a Cochrane review of three randomized, controlled studies with limited sample sizes that examined interventions for oropharyngeal dysphagia in children with neurological impairment. The authors’ noted that it was not possible to reach definitive conclusions on the effectiveness of particular interventions for oropharyngeal dysphagia based on these studies. The authors concluded that there is currently insufficient high-quality evidence from randomized, controlled trials or quasi-randomized, controlled trials to provide conclusive results about the effectiveness of any particular type of oral-motor therapy for children with neurological impairment and note that there is an urgent need for larger-scale randomized trials to evaluate the efficacy of interventions for oropharyngeal dysphagia.

Professional Societies/Organizations —Swallowing/Feeding Therapy: 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, et al., 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.”

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. It is proposed to be used as an adjunct to standard dysphagia therapy.
The best-evidence synthesis demonstrated indicative findings in favor of NMES for swallowing. The effect size was identified for the application of NMES for swallowing (p<.001). The heterogeneity was significant. Studies. The NMES electrode placement was not detailed in two of the seven studies. A significant summary provided over a variable period of one to 24 weeks, with a number of total treatment sessions varying across the weight gain, functional eating, residue on a swallowing x-ray study, or laryngeal elevation. The treatment was multiple etiologies. Therapeutic outcome was evaluated using various methods that included swallowing scale, for the combined trials (p<.10). When two outlier trials were removed, the heterogeneity was no longer significant. A meta-analysis was conducted to evaluate the effect of transcutaneous NMES on swallowing rehabilitation currently available. Intramuscular NMES has been investigated in a single Phase I exploratory study.

The VitalStim® (Empi, Inc., St. Paul, MN) was developed for the treatment of dysphagia and granted FDA 510(k) approval in 2001. A second device, the VitalStim Experia® clinical device (Empi, Inc., St. Paul, MN) was 510(k) approval in 2007. These Class II devices are approved for muscle re-education by external stimulation to the muscles necessary for pharyngeal contraction.

**Literature Review—Electrical Stimulation for Dysphagia:**

Byeon et al, (2016) reported on a study that compared the effectiveness of neuromuscular electrical stimulation and thermal tactile oral stimulation (TTOS) in patients with sub-acute dysphagia caused by stroke. The study included 55 who were randomly assigned into the NMES group (n=27) or TTOS group (n=28). The NMES group received 30 minutes of stimulation per day 5 days per week for 3 weeks with Vitalstim for a total of 15 treatments. The study found that analysis of pre-post values of videofluoroscopic studies of the neuromuscular electrical stimulation and thermal tactile oral stimulation groups using a paired t-test showed no significant difference between the two groups despite both having decreased mean values of the videofluoroscopic studies after treatment. The study was limited by the small number of patients and short follow-up time.

Christiaanse et al. (2011) conducted a retrospective study to compare change in swallowing function in pediatric patients with dysphagia who received neuromuscular electrical stimulation (NMES) (N=46) to a control group (N=47) who received usual oral motor training and dietary manipulations without NMES. Analysis of change in Functional Oral Intake Scale (FOIS) level was derived from videofluoroscopic swallowing studies performed before and after NMES. There was an average of 22 treatment sessions over 10 weeks. Improvement was noted in both groups in their FOIS level (p<0.01) but the amount of change was not different (p=0.11). The treatment group who had acquired dysphagia improved more than the similar subgroup of control children (p=0.007). The authors concluded that NMES treatment of anterior neck muscles in a heterogeneous group of pediatric patients with dysphagia did not improve the swallow function more than that seen in patients who did not receive NMES treatment.

Xia et al. (2011) conducted a randomized, controlled trial of 120 patients with post-stroke dysphagia to investigate the effects of VitalStim therapy coupled with conventional swallowing training. Patients were randomly and evenly divided into three groups: conventional swallowing therapy group, VitalStim therapy group, and VitalStim therapy plus conventional swallowing therapy group. Prior to and after the treatment, signals of surface electromyography (sEMG) of swallowing muscles were detected, swallowing function was evaluated by using the Standardized Swallowing Assessment (SSA) and Videofluoroscopic Swallowing Study (VFSS) tests, and swallowing-related quality of life (SWAL-QOL) was evaluated using the SWAL-QOL questionnaire. After four weeks treatment, all groups showed improvement. The sEMG value, SSA, VFSS and SWAL-QOL scores were greater in the VitalStim therapy plus conventional swallowing training group than in the conventional swallowing training group and VitalStim therapy group. There was no significant difference found between conventional swallowing therapy group and VitalStim therapy group. Further studies that include larger subject population and that evaluate long-term effects of electric stimulation and the combined method are needed.

A systematic review the literature examining the effects of neuromuscular electrical stimulation (NMES) on swallowing and neural activation was conducted by Clark, et al. (2009). The review included 14 trials. Most of the studies (10/14) were considered exploratory research (non-experimental design conducted on non-disordered populations or used NMES as a condition to examine swallowing abilities instead of an intervention). Many of the studies were noted to have significant methodological limitations. The authors concluded that the systematic review “reveals that surface NMES to the neck has been most extensively studied with promising findings, yet high-quality controlled trials are needed to provide evidence of efficacy. Surface NMES to the palate, faucial pillars, and pharynx has been explored in Phase I research, but no evidence of efficacy is currently available. Intramuscular NMES has been investigated in a single Phase I exploratory study.”

A meta-analysis was conducted to evaluate the effect of transcutaneous NMES on swallowing rehabilitation (Carnaby-Mann, et al., 2007). The review included 7 studies with a total of 255 patients with dysphagia due to multiple etiologies. 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 was provided over a variable period of one to 24 weeks, with a number of total treatment sessions varying across the studies. 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.”

Randomized controlled trials with small patient populations and short-term follow-ups have investigated NMES for the treatment of dysphagia. Control groups were treated with traditional dysphagia treatment for Parkinson’s disease (n=86) (Heijen, et al., 2012) and rehabilitation swallowing therapy (n=34) (Permsirivanich, et al., 2009), thermal-tactile stimulation treatment (n=36) (Lim, et al., 2009), traditional swallowing therapy (n=25) (Bulow, et al., 2008), and sham stimulation (n=14) (Ryu, et al., 2008) for the treatment of dysphagia in stroke patients. Various outcome measures were used and the follow-up rates in one study were 48%-67% of the initial patient population. Studies reported improvement in some outcomes in the NMES groups while other studies reported no significant improvement (e.g., quality of life).

Several prospective, and retrospective studies were conducted to examine the efficacy of electrical stimulation for treatment of dysphagia (Ludlow, et al., 2007; Kiger, et al., 2006; Blumenfeld, et al., 2006.; Leelamanit, et al., 2002; Freed, et al., 2001). These studies mainly had small number of subjects, had inconsistent results and are not conclusive regarding the efficacy of this treatment. The treatment should be confirmed in prospective, randomized, placebo-controlled, clinical trial in individuals of varying disease severity and rehabilitation potential.

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—Electrical Stimulation for Dysphagia:** 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, et al., 2006).

**Speech Software and Computer-Based Programs**
Computer-based programs have been developed that are proposed to improve reading and language skills. The use of speech software or computer-based programs, (e.g., Fast ForWord® [Scientific Learning Corporation, Oakland, CA], Laureate Language Systems [Laureate Learning Systems, Inc. Winooski, VT]) repetitive training devices/exercises or school-based programs are considered training in nature and are not considered medically appropriate, as they do not involve the formal interaction of one-to-one supervision with a speech-language pathologist.

LSVT LOUD® therapy (LSVT Global, Inc., Tucson, AZ) utilizes LSVT Companion® System. This device received FDA 510K approval August 2009 and is classified as: Aids, Speech Training for the Hearing Impaired. The intended use is as a technical aid complementing person-to-person speech therapy to improve the vocal loudness of persons with Parkinson’s disease. The sound produced by an individual's voice is received by a calibrated microphone and converted to a visual display which consists of different visual and auditory feedback. The individual is given a target range of both vocal intensity (loudness) and fundamental frequency (pitch) and instructed to maintain a given loudness and or pitch for a given duration. Increases in the complexity of the spoken material are combined with these targeted vocal parameters. In this way, individuals are trained to increase both vocal loudness and variations in pitch through a series of exercises. The device consists of software that allows clinicians to manage speech therapy for clients as well as allow clients to perform speech "homework" on their home PC.

**Literature Review—Speech Software and Computer-Based Programs:** Bothe et al. (2008) conducted a randomized controlled trial to compare the language and auditory processing outcomes of children assigned to Fast ForWord-Language (FFW-L) to the outcomes of children assigned to nonspecific or specific language intervention comparison treatments that did not contain modified speech. Two hundred and sixteen children
between the ages of 6 and 9 years with language impairments were randomly assigned to one of four arms: FFW-L, academic enrichment (AE), computer-assisted language intervention (CALI), or individualized language intervention (ILI) provided by a speech-language pathologist. One hour and 40 minutes of therapy was provided to all children, five days per week, for six weeks. Language and auditory processing measures were administered to the children by blinded examiners before treatment, immediately after treatment, three months after treatment, and six months after treatment. The children in all four arms improved significantly on a global language test and a test of backward masking. The children with poor backward masking scores who were randomized to the FFW-L arm did not present greater improvement on the language measures than children with poor backward masking scores who were randomized to the other three arms. Participants in the FFW-L and CALI arms earned higher phonological awareness scores than children in the ILI and AE arms at the six-month follow-up testing. The FFW-L program, the language intervention that provided modified speech to address a hypothesized underlying auditory processing deficit, was not more effective at improving general language skills or temporal processing skills than a nonspecific comparison treatment (AE) or specific language intervention comparison treatments (CALI and ILI) that did not contain modified speech stimuli. These findings question the temporal processing hypothesis of language impairment and the proposed benefits of using acoustically modified speech to improve language skills. In view of the finding that children in the three treatment arms and the active comparison arm made clinically relevant gains on measures of language and temporal auditory processing appears to indicate that a variety of intervention activities can facilitate development.

Use Outside of the US
No relevant information found.

Summary
Speech therapy services may be appropriate for a subset of individuals with a severe speech impairment. There should be clear documentation of this process, and the goal(s) of therapy should include measures that will be used to demonstrate that a meaningful improvement has occurred as a result of the therapy.

Determination of the medical necessity for speech therapy for an adult or child should be based on the individual’s medical condition and the severity of the functional impairment; age-specific functional impairment scores should be used, and the evaluation should be conducted by a certified speech-language pathologist. The therapy plan should include measurable goals, testing applications that will be used to measure improvement, and specific timeframes to begin an early transition from one-to-one supervision by a professional to a patient- or caregiver-provided level.

Voice therapy is a form of speech therapy that is used for treatment of voice disorders. Voice therapy may be considered medically necessary when there is a significant voice disorder that is the result of anatomic abnormality, neurological condition, or injury (e.g., vocal nodules or polyps, vocal cord paresis or paralysis, post-operative vocal cord surgery, paradoxical vocal cord motion).

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. There is insufficient evidence in the published, peer-reviewed scientific literature to conclude that electrical stimulation is effective in the treatment of dysphagia.

Coding/Billing Information

Note: 1) This list of codes may not be all-inclusive.
   2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Covered when medically necessary:
<table>
<thead>
<tr>
<th>CPT® Codes</th>
<th>Description</th>
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<tbody>
<tr>
<td>92507</td>
<td>Treatment of speech, language, voice, communication, and/or auditory</td>
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<tr>
<td></td>
<td>processing disorder; individual</td>
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<tr>
<td>92521</td>
<td>Evaluation of speech fluency (eg, stuttering, cluttering)</td>
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<tr>
<td>92522</td>
<td>Evaluation of speech sound production (eg, articulation, phonological process,</td>
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<tr>
<td></td>
<td>apraxia, dysarthria);</td>
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<tr>
<td>92523</td>
<td>Evaluation of speech sound production (eg, articulation, phonological process,</td>
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<tr>
<td></td>
<td>apraxia, dysarthria); with evaluation of language comprehension and expression</td>
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<tr>
<td></td>
<td>(eg, receptive and expressive language)</td>
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<tr>
<td>92524</td>
<td>Behavioral and qualitative analysis of voice and resonance</td>
</tr>
<tr>
<td>92526</td>
<td>Treatment of swallowing dysfunction and/or oral function for feeding</td>
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<tr>
<td>92610</td>
<td>Evaluation of oral and pharyngeal swallowing function</td>
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<tr>
<td>G0153</td>
<td>Services performed by a qualified speech-language pathologist in the home</td>
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<tr>
<td></td>
<td>health or hospice setting, each 15 minutes</td>
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<tr>
<td>S9128</td>
<td>Speech therapy, in the home, per diem</td>
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<tr>
<td>S9152</td>
<td>Speech therapy, re-evaluation</td>
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**Not Medically Necessary/Training/Not Covered:**

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<td>92508</td>
<td>Treatment of speech, language, voice, communication, and/or auditory</td>
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<td></td>
<td>processing disorder; group, 2 or more individuals</td>
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**Experimental/Investigational/Unproven/Not Covered when used to report electrical stimulation for swallowing/feedings disorders:**

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<th>Description</th>
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<td>97014</td>
<td>Application of a modality to 1 or more areas; electrical stimulation (unattended)</td>
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<tr>
<td>97032</td>
<td>Application of a modality to 1 or more areas; electrical stimulation (manual), each 15 minutes</td>
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<th>Description</th>
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<tr>
<td>G0283</td>
<td>Electrical stimulation (unattended), to one or more areas for indication(s) other than wound care, as part of a therapy plan of care</td>
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**References**


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