Clinical Practice Guideline: **Pediatric Intensive Feeding Programs**

Date of Implementation: **June 16, 2016**

Product: **Specialty**

Related Policies:
CPG 155: Occupational Therapy Medical Policy/Guideline
CPG 166 Speech-Language Pathology/Speech Therapy Guidelines

GUIDELINES

ASH considers treatment of feeding disorder in an outpatient pediatric intensive multidisciplinary feeding program medically necessary when ALL of the following criteria are met:

- Individual has a significant feeding disorder associated with a medical condition (e.g., failure to thrive, prematurity, neurologic conditions, developmental disability, gastrointestinal disorders, gastrostomy tube).
- Adequate treatment for any contributing underlying medical conditions, if present, has occurred without resolution of the feeding problem.
- Conventional outpatient treatment has not succeeded. At least 8 weeks of conventional treatment must be documented.
- Meaningful improvement is expected from the therapy.
- The therapy is individualized, and there is documentation outlining quantifiable, attainable short- and long-term treatment goals.
- The treatment plan includes active participation/involvement of a parent or guardian.
- The treatment includes a transition from one-to-one supervision to outpatient therapy on discharge.

Note: Regular documentation supporting significant progress toward treatment is required to determine the medical necessity of continuation of a pediatric intensive multidisciplinary feeding program.

Not Medically Necessary

A pediatric intensive multidisciplinary feeding program is considered not medically necessary for any of the following:

- Maintenance or preventive treatment provided to prevent recurrence or to maintain the patient's current status;
- Treatment intended is to improve or maintain general physical condition;
- When a home feeding program can be utilized to continue therapy;

- Therapy that duplicates services already being provided as part of an authorized therapy program through another therapy discipline;
- Swallowing/feeding therapy for food aversions that are meeting normal growth and developmental milestones.

ASH considers pediatric intensive feeding programs unproven for all other indications (e.g., childhood obesity, Prader-Willi syndrome) because their effectiveness for indications other than those listed above has not been established.

ASH considers electrical stimulation for the treatment of swallowing/feeding disorders experimental and investigational because its effectiveness for these indications has not been established.

Also, feeding disorders should not be confused with eating disorders, such as anorexia, which are more common in adolescence and adulthood.

ICD-10 Codes and Descriptions that Support Medical Necessity (may not be all inclusive dependent upon coverage of developmental delay per benefit)

ICD-10 Codes	ICD-10 Code Description
D51.0 - D53.9	Vitamin B12, folate, and other deficiency anemias
E41 E43	Nutritional marasmus and unspecified severe protein-calorie malnutrition
E44.0 - E46	Protein-calorie malnutrition
E56.0 - E63.9	Other nutritional deficiencies
E70.0 - E71.2 E72.00 - E72.51E72.59 - E72.9	Disorders of amino-acid transport and metabolism
E71.30, E75.21 - E75.22 E75.240 - E75.249 E75.3 E75.5 - E75.6 E77.0 - E78.70 E78.79 - E78.9 E88.1 - E88.2 E88.89	Disorders of lipoid and glycoprotein metabolism and other specified metabolic disorders
E73.0 - E74.9	Disorders of carbohydrate transport and metabolism

E83.00 - E83.19 E83.30 - E83.9 E20.1	Disorders of mineral metabolism
E86.0 - E87.8	Disorders of fluid, electrolyte, and acid-base balance
K90.1 - K90.49 K90.89	Intestinal malabsorption
N18.1 - N18.9	Chronic kidney disease (CKD)
P74.0 - P74.49	Other transitory neonatal electrolyte and metabolic disturbances
P84	Other problems of newborn (acidosis)
P92.1 - P92.9	Feeding problems in newborn
Q35.1 - Q37.9	Cleft palate and cleft lip
R13.0 - R13.19	Aphagia and dysphagia
R62.51	Failure to thrive (child)
R63.30 – R63.39	Feeding difficulties
R63.4	Abnormal weight loss
R63.6	Underweight
R63.8	Other symptoms and signs concerning food and fluid intake

Related CPT Codes (not all inclusive)

CPT® Code	CPT® Code Description
92610	Evaluation of oral and pharyngeal swallowing function
92526	Treatment of swallowing dysfunction and/or oral function for feeding

BACKGROUND AND DESCRIPTION

Good nutrition is essential for the growth and development of babies. Feeding progressions are based on specific reflexes and the development of the baby's mouth. Initially they are able to suck and swallow and as their first year progresses; they are soon able to chew. The gastrointestinal or digestive tract matures from being only able to handle liquids such as breastmilk or formula, to being able to digest a variety of foods. During this time the baby moves from requiring help to feed to being able to feed themselves. As the infant matures into a child, their food and feeding patterns continue to change and this rate is dependent upon many things, including the baby's own skills and attitudes. However, babies will do

best with feeding if they are supported in progressing at their own rate. Development of specific reflexes is involved in feeding and eating. The different reflexes involved include:

- Rooting reflex—When a baby's mouth, lips, cheek, or chin are touched by an object, the head and mouth turn towards the object and the baby opens its mouth. This reflex allows a baby to seek out and grasp a nipple.
- Suck/swallow reflex—When the baby's lips and mouth area are touched in an open mouth position, suckling or sucking movements begin. As liquid moves into the mouth, the tongue moves it to the back of the mouth for swallowing.
- Tongue thrust reflex—When the lips are touched, the baby's tongue moves out of the mouth. This reflex allows for feeding from the breast or bottle but not from a spoon or cup.
- Gag reflex—When an object, such as a spoon or solid food, is placed way back in the mouth, the object is quickly moved back out of the mouth by the tongue. This reflex is one reason for waiting until a baby is 4 to 6 months old to feed solid foods.

These reflexes may be stronger or weaker, or last longer than normal, in babies who are delayed in their development.

Feeding is a critical self-help skill that develops during infancy and toddlerhood. Inability to self-feed in toddlers or to be cooperative with caretaker feeding during infancy may result in severe functional limitation, thus contributing to or establishing disability. Feeding and swallowing is a complex process that involves the mouth, pharynx, larynx and esophagus. In infants, the first phase also includes the sucking reflex. 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 difficultly mastering them at a later point, leading to feeding problems. In infants and children, the feeding and swallowing process includes the following phases: pre-oral or oral preparatory phase; oral phase; pharyngeal phase; and esophageal phase (American Speech-Language-Hearing Association [ASHA]).

Pediatric feeding disorders are a multifaceted set of feeding and swallowing problems that include a wide range of problems that interfere with the attainment of age-appropriate feeding habits and result in inadequate caloric or nutritional intake, thus compromising normal growth and development rates. A feeding problem is defined as "The failure to progress with feeding skills. Developmentally, a feeding problem exists when a child is 'stuck' in their feeding pattern and cannot progress." Feeding disorders may occur frequently in early childhood. They are fairly common in infants and toddlers, with approximately 25-35% of these children experiencing some difficulties (considered minor) with feeding (Kodak, 2008). The incidence of severe feeding problems has been reported to be as high as 40-70% among infants born prematurely or in children with chronic medical conditions (Rogers, 2004).

Feeding disorders include problems gathering food and getting ready to suck, chew, or swallow it. For example, a child who cannot completely close her lips to keep food from falling out of her mouth may have a feeding disorder. Other examples of feeding problems may include but are not limited to food refusal, disruptive meal-time behavior, rigid food preferences, suboptimal growth, and failure to master self-feeding skills commensurate with the child's developmental abilities. Swallowing disorders, also called dysphagia, can occur at the (previously mentioned) different stages in the swallowing process:

- Oral prep phase – preparing food or liquid in the oral cavity to form a bolus which includes sucking, manipulating and chewing
- Oral phase – transit of food or liquid into the throat
- Pharyngeal phase – starting the swallow, squeezing food down the throat, and closing off the airway to prevent food or liquid from entering the airway (aspiration) or to prevent choking
- Esophageal phase – relaxing and tightening the cervical and thoracic levels of the esophagus transferring the food or liquid via esophageal peristalsis into the stomach (Logemann,1998)

Dysphagia and feeding problems are classified according to which phase of swallowing is affected. Oral dysphagia in children is seen most commonly in those with neurodevelopmental disorders. 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. Underlying medical conditions that may cause dysphagia may include, but are not limited to:

- Neurological disorders (e.g., cerebral palsy)
- Disorders affecting suck-swallow-breathing coordination (e.g., bronchopulmonary dysplasia)
- Structural lesions (e.g., neoplasm, cleft)
- 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)

Signs and symptoms of a significant feeding disorder may include refusal to eat or drink; difficulty swallowing, inability to self-feed at an appropriate age, requiring an abnormally long time to eat, choking, gagging, or vomiting when eating, or other inappropriate mealtime behaviors. If such feeding problems occur for a prolonged period of time, they will have a significant effect upon the child's nutritional intake, affecting growth and development rates and may result in frequent illnesses, or death in severe cases. Such disorders may also be accompanied by behavioral problems such as hitting, biting, kicking, tantrums, crying, and vomiting at mealtime as an attention-getting strategy. The most common signs and symptoms of feeding disorders and 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 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.

Feeding disorders may result from a wide range of causes, including medical conditions (for example, food allergies, neurologic or neuromuscular disease, gastroesophageal reflux, and others), structural or functional abnormalities (for example, defects of the palate), or behavioral issues (for example, crying or tantrums that prevent successful completion of mealtimes). In most cases, there is likely a complex interaction among multiple causative factors. Additionally, often therapists are challenged by the fact that children are unable to tell them what they are feeling or what is wrong. For example, a significant number of children with feeding difficulty also have a history of gastrointestinal problems such as gastroesophageal reflux, constipation, poor appetite, poor weight gain, and sometimes food intolerance. Medical problems such as gastroesophageal reflux disease (GERD) may cause eating to be painful. Early experiences with pain during eating can cause the child to refuse, avoid, or stop eating and develop behavior problems that make it difficult if not impossible for the parent to feed the child. Additionally, frequent avoidance of eating may contribute to failure to develop appropriate oral sensorimotor skills required for successful eating and swallowing due to decreased practice eating the needed amount of food for normal growth and development and poor reception of age-appropriate foods. Thus, improving stomach comfort is a key to successful treatment. For a child to be diagnosed with feeding disorder of infancy or early childhood, the disorder must be severe enough to affect growth for a significant period of time.

Infants and children who are tube fed for extended periods of time have an especially high occurrence of feeding problems. For these patients, there appears to be a "critical period" for developing proper oral feeding patterns and reflexes. This critical period has been described as being between six and seven months of age, during which acquisition of oral food consumption skill is most likely. Beyond this period oral feeding abilities may not be established or may be established with great difficulty. These results were based on case studies and overall program evaluation indicated that medically complicated, severe feeding disorders can be treated successfully in a few months with a multidisciplinary approach which incorporates behavioral procedures (Babbitt, 1994).

Premature infants and those that are of very low birth weight are at very high risk for feeding disorders (Rommel et al., 2003; Schädler et al., 2007; Vohr et al., 2006). The underdeveloped sphincter muscle between the stomach and esophagus can cause the infant

to spit up frequently during feedings. Because this is uncomfortable for the child, he or she may not want to eat. Schädler et al. (2007) describes the successful use of behavioral therapy for severe feeding disorders in 86 premature children. However, they indicate that other conditions such as cerebral palsy, mental retardation and interaction problems, which are frequent in this population, have a significant negative impact on therapy outcomes and may require an even more intensive approach to address feeding disorders. Authors support the addition of behavioral therapy in that they noted a therapeutic intervention based on behavioral therapy achieved sustained success in almost two thirds of the children.

According to the recommendations of the Cole and Lanham and published in American Family Physicians (2011), screening for nutrition risks and problems is an expected part of routine preventive health services. Failure to thrive in childhood is a state of undernutrition due to inadequate caloric intake, inadequate caloric absorption, or excessive caloric expenditure. In the United States, it is seen in 5 to 10 percent of children in primary care settings. Although failure to thrive is often defined as a weight for age that falls below the 5th percentile on multiple occasions or weight deceleration that crosses two major percentile lines on a growth chart, use of any single indicator has a low positive predictive value. There is no consensus on which specific anthropometric criteria should be used to define FTT. Most cases of failure to thrive involve inadequate caloric intake caused by behavioral or psychosocial issues. The most important part of the outpatient evaluation is obtaining an accurate account of a child's eating habits and caloric intake (Cole and Lanham, 2011). Failure to thrive (FTT) is a term used to describe inadequate growth or the inability to maintain growth, usually in early childhood. It is a sign of undernutrition, and because many biologic, psychosocial, and environmental processes can lead to undernutrition, FTT should never be a diagnosis unto itself. A combination of anthropometric criteria, rather than one criterion, should be used to more accurately identify children at risk of FTT (Cole and Lanham, 2011). Weight for length is a better indicator of acute undernutrition and is helpful in identifying children who need prompt nutritional treatment. A weight that is less than 70 percent of the 50th percentile on the weight-for-length curve is an indicator of severe malnutrition and may require inpatient treatment (Cole and Lanham, 2011).

When the feeding problem is severe or complex, medical causes of FTT have been treated, and initial treatment efforts by a single discipline (e.g., occupational therapist, speech language pathologist) have failed, intensive treatment is considered. A referral is made to an interdisciplinary team for assessment and intervention in order to evaluate and treat all factors influencing growth. Services can include a comprehensive clinic evaluation, videofluoroscopic swallow study, feeding therapy, and family and caregiver education. A nutrition assessment completed by a registered dietitian obtains information needed to rule out or confirm a nutrition related problem. Nutrition assessment consists of an in-depth and detailed collection and evaluation of data in the following areas: anthropometrics, clinical/medical history, diet, developmental feeding skills, behavior related to feeding, and

biochemical laboratory data. During the assessment, risk factors identified during nutrition screening are further evaluated and a nutrition diagnosis is made. The assessment may also reveal areas of concern such as oral-motor development or behavioral issues that require referral for evaluation by the appropriate therapist or specialist. Other members of the interdisciplinary team may include behaviorists, occupational therapist, physical therapist, speech language pathologist/therapist, social worker, and home health care providers.

Disorders of the digestive system can also cause feeding problems. Examples of these types of conditions include structural or functional abnormalities of the mouth, throat, or esophagus that may result in inability to chew or swallow, or cause pain during swallowing, or result in aspiration (inhaling food or fluid into the lungs). Celiac disease, necrotizing entercolitis, Hirschprung disease, short bowel syndrome, pyloric stenosis, and GERD may also contribute to disordered feeding behaviors. A small controlled study by Mathisen et al. (1999) concluded that the presence of GERD had a significant negative impact on the energy intake of affected infants. Such infants demonstrated fewer adaptive skills and readiness behaviors for solid foods, and significantly more food refusals and food loss at meal times.

Neurologic and neuromuscular disorders, such as cerebral palsy, are associated with significantly increased difficulty with feeding. Field (2003) reported on 349 participants evaluated by an interdisciplinary feeding team that the frequencies of predisposing factors varied by feeding problem. Differences were found in the prevalence of the five feeding problems among children with three different developmental disabilities: autism, Down syndrome and cerebral palsy. Gastroesophageal reflux was the most prevalent condition found among all children in the sample and was the factor most often associated with food refusal. Neurological conditions and anatomical anomalies were highly associated with skill deficits, such as oral motor delays and dysphagia. In such children, spasticity or weakness of the oral musculature results in difficulty with oral food preparation prior to swallowing (for example, sipping, sucking, or chewing), but problems swallowing may also be present. This may progress from simple frustration to more significant problems such as aspiration and respiratory infections (Arvedson, 2008; Field, 2003; Gisel, 2008; Rogers, 2004). Rogers (2004) concludes that oral feeding interventions for children with cerebral palsy may be effective in promoting oral motor function but have not been shown to be effective in promoting feeding efficiency or weight gain. Feeding gastrostomy tubes are a reasonable alternative for children with severe feeding and swallowing problems who have had poor weight gain. According to Arvedson (2008), in addition to the status of feeding in the child, considerations include health status, broad environment, parent-child interactions, and parental concerns. Interdisciplinary team approaches allow for coordinated global assessment and management decisions. Underlying etiologies or diagnoses must be delineated to every extent possible because treatment will vary according to history and current status in light of all factors that are often interrelated in complex ways.

Feeding problems are common even in normally developing infants and children. However, they are more frequent and persistent in children with developmental disabilities (Gisel, 2008). Developmental disorders, such as Down syndrome and autism spectrum disorders, may also contribute to feeding problems (Manikam and Perman, 2000). According to Manikam and Perman (2000), pediatric feeding disorders are common: 25% of children are reported to present with some form of feeding disorder. However, this number increases to 80% in developmentally delayed children. Consequences of feeding disorders can be severe, including growth failure, susceptibility to chronic illness, and even death. While such individuals frequently have co-existing physical disorders as described above, they may also demonstrate unique behavioral issues that impair feeding (Kodak, 2008; Schreck et al., 2004). Schreck et al. (2004) reported results indicating children with autism have significantly more feeding problems and eat a significantly narrower range of foods than children without autism. According to Kodak (2008), children diagnosed with autism or autism spectrum disorders (ASD) are more likely than other children to exhibit behaviors characteristic of a feeding or sleeping disorder. Food aversion and food refusal in these individuals are sometimes linked to difficulties with food texture and type which significantly limit the accepted food options for these individuals. It is important to note that feeding disorders may be comorbid with developmental disorders without being part of the developmental disorder itself. There are no developmental disorders whose diagnostic criteria include feeding disorders as defined above. The rationale for treatment is that children whose feeding problems are treated with nasogastric, gastrostomy, or jejunostomy tubes are more likely to need therapy to become oral feeders. Placement of a feeding tube has been shown to actually cause or worsen feeding problems for many children (Crosby and Duerksen, 2007). Crosby and Duerksen (2007) examined the long-term complications related to tube malfunction and the effect these have on health care use. Common tube-site complications included discharge from the tube site, red or tender stoma, and granulation tissue. Mechanical problems related to tubes plugging, breaking, and falling out were also common. Despite having a dedicated nurse and dietitian to follow these patients, unscheduled health care contacts were frequent and averaged 5.4 contacts over the mean follow-up time of 10.5 months. Authors concluded that in patients receiving long-term home enteral nutrition, tube and tube-feeding complications are frequent and result in significant health care use.

Pediatric feeding problems are typically treated in outpatient settings by individual practitioners. Some hospitals have developed comprehensive outpatient clinics with interdisciplinary care models called “pediatric intensive feeding programs” or “feeding clinics” that are designed to evaluate, diagnose, and treat children with severe or complex feeding and swallowing difficulties. Pediatric feeding disorder evaluation and, at times, treatment are most likely best performed by a multi-or inter-disciplinary team in an outpatient setting. These interdisciplinary clinics are intended to provide greater environmental control, greater frequency of treatment, accelerated learning by increased contact with caregivers, and frequent medical and nutrition monitoring to provide

clinicians with additional treatment options (e.g., appetite manipulation, swallow induction). The interdisciplinary team of specialists work with the child and family to address the multiple factors involved with eating. Members of this team may include, but are not limited to, a pediatrician, family physician, gastroenterologist, dietitian, occupational therapist, speech-language pathologist, pediatric behavioral and developmental specialist, psychologist, and social worker. These professionals work together to assess the individual and determine the possible underlying causes for the disorder, followed by creating a treatment plan. Outpatient programs are typically provided eight hours a day, five days per week, and involves feeding sessions of 3–-5 meals a day. Between feeding sessions, the patient may be involved in other therapies if needed, playroom, naps or school activities. The day program typically lasts approximately 4–8 weeks.

The assessment process should evaluate a wide range of issues, including the structure and function of the mouth, upper airway, gastrointestinal tract and duration of the feeding problem; as well as behavioral aspects of feeding such as the parental-child interaction. Programs vary across locations but generally focus on the feeding problems of infants and children up to 16 years of age. The Kennedy Krieger Institute (Baltimore, MD) is an example of a facility that offers services ranging from outpatient assessment, intensive day treatment, and inpatient feeding programs that typically last about 8 weeks. Key aspects of the program include direct observation behavior assessment, approaches for increasing and decreasing feeding behavior, skill acquisition, transfer of treatment gains, and parent training. Treatment for diagnosed pediatric feeding disorders may also require a multidisciplinary team approach. This team includes the same types of professionals who treat both the causative and underlying medical conditions, as well as provide the various interventions deemed appropriate for the treatment of the individual.

In many intensive treatment programs, the intervention involves 3 phases: (1) the child is fed directly by the therapist to establish a new set of feeding responses, (2) parents are introduced into the feeding environment, and (3) parents feed their child with clinicians coaching remotely.

The multidisciplinary feeding team may include, but is not limited to, the following members:

Pediatric psychologist: Provides a behavioral viewpoint on feeding disorders, assesses for associated behavioral or psychiatric conditions involved for the child or family structure, and provides interventions or refers as appropriate. Behavioral treatment techniques include application of meal-time structure and a feeding schedule, appetite and behavior management, as well as parent training.

Physician: Monitors overall medical well-being of the child and provides oversight and support as needed while the child is in treatment, including medical studies to identify and treat various physiological causes, medication management, and coordination of the entire treatment team.

Dietitian/Nutritionist: Provides targeted nutrition interventions to improve growth (weight at or above 90 % of ideal body weight for length), improve growth rate, nutrient intake, and nutrient balance. They will also guide families to avoid harmful foods/supplements.

Occupational therapist: Focus on enhancing feeding performance by applying techniques to improve the mechanics of feeding or by suggesting strategies to their primary caregivers to promote feeding interaction and improve children's mealtime behaviors.

Speech and language pathologist: Includes therapies to improve chewing and swallowing coordination, strengthen oral musculature, and improve oral tolerance to a broad range of flavors, textures, and temperatures of foods.

Most nutrition and feeding problems of children can be improved or controlled but may not be totally resolved in complex cases. Some children may require ongoing and periodic nutrition assessment and intervention. Hospitalization may be neither helpful nor necessary unless the child is severely malnourished, seriously ill, or at risk of harm. Separation of the child from the family by hospitalization may result in more issues that may cause a delay in feeding and supporting the child within his or her normal environment (Kirkland and Motil, 2010).

Indications for hospitalization include:

- Extremely problematic parent-child interaction
- Failure to respond to several months of out-patient management
- Precise documentation of energy intake
- Psychosocial circumstances that put the child at risk for harm
- Serious inter-current illness or significant medical problems
- Severe malnutrition (less than or equal to 75 % of ideal body weight)
- Significant dehydration

Medical strategies that promote “gut” comfort and encourage appetite will help the child be receptive to eating and can improve response to feeding therapy. These strategies typically involve the following:

- Addressing weight gain and growth as the priority of a feeding program
- Treating constipation and establishing a routine of daily soft stooling
- Treating gastroesophageal reflux and hypersensitivity in the GI tract

- Using hydrolyzed formulas that are easier to digest and promote gastric emptying and stooling
- Adjusting tube feeding rates and schedules to promote comfort
- Using appetite stimulants to boost hunger

Some children's feeding skills improve dramatically with medical management alone. Depending on the child, using medical management strategies can take multiple visits over time with the physician. If the child's symptoms persist despite using medicines for reflux and constipation, a pediatrician may decide to refer the child to a gastroenterologist or feeding team for specialized care. A child also may undergo further tests to rule out further medical diagnoses that can negatively affect eating such as anemia, food allergy, eosinophilic esophagitis, malrotation, and motility disorders. Other children will need feeding therapy using techniques to improve acceptance of volume and variety of foods as well as oral motor therapy to progress to age appropriate oral motor patterns. No matter what type of feeding therapy approach used, the child will respond better if they feel better. Many therapists have been taught to start with the mouth from a treatment perspective. That means focusing on the oral motor hypersensitivity or oral motor delay first. It is important to consider that despite the physician addressing the medical issues, such as reflux, it is team effort because the physician may not see the child eat and also don't see the children as often as the therapist does. Therefore, it is important that therapists work closely with the referring physicians to assist with proper diagnosis and treatment in order to assure the best outcomes for patients. The most important reason to recognize and treat the underlying medical issues of children with pediatric feeding problems is to help them progress. It is important that GI issues are addressed prior to starting therapy so that pain or discomfort is not reinforced for the child. Therapy goals for most patients involve weight gain and growth, age appropriate oral motor patterns, and acceptance of a variety of foods from all food groups for healthy eating. Using medical strategies to help the child feel better will improve response to feeding therapy and eventually outcomes.

A pediatric intensive, multidisciplinary feeding program may be provided on an inpatient basis or daily outpatient basis, which is also referred to as a day feeding program. The inpatient programs are generally recommended for children with severe feeding difficulties who may require around-the-clock medical supervision. The Kennedy Krieger Institute website for their pediatric feeding disorders unit states that, "Inpatient services are recommended for children with severe feeding difficulties (e.g., failure-to-thrive, vomiting, G-tube dependence, total food refusal) so that close medical assessments, nutritional monitoring, oral motor assessments and intense behavioral interventions can be conducted."

An outpatient program is typically provided eight hours a day, five days per week, and involves feeding sessions of 3-5 meals a day. Between feeding sessions, the patient may

be involved in other therapies if needed, playroom, naps or school activities. The day program typically lasts approximately 4–8 weeks.

EVIDENCE REVIEW

Treatment of Pediatric Feeding Disorders

Byars et al. (2003) conducted a prospective clinical trial for the purpose of describing outcomes in nine children with Nissen fundoplication and feeding gastrostomy (G-tube) treated in a multicomponent intensive feeding program. Nine children with a history of behavioral feeding resistance and G-tube dependence were admitted for intensive treatment to an inpatient feeding program. The treatment included short-term behavioral treatment with a family-focused approach. A team of behavioral therapists managed all aspects of behavioral treatment. A gastroenterologist and registered dietician monitored and managed the medical and nutritional status. At discharge, it was reported that 44% of the sample had been successfully weaned from gastrostomy feedings. At follow-up, six of the nine patients (67%) were weaned from G-tube feeding and taking 100% of their nutritional needs by mouth. It was noted that range of inpatient treatment was 5–16 days. Follow-up assessment was obtained in a clinic visit scheduled 2–4 months after the child's discharge from the program. Three families did not return for the follow-up visit due to distance from the facility. Weight gains were noted to be small. Limitations of the study included no control group, the small group size and the length of follow-up time after the study. Sharp et al. (2010) conducted a systematic review of the literature regarding treatment of pediatric feeding disorders. The review included 48 single-case research studies that reported outcomes for 96 participants. Most children in the studies had complex medical and developmental concerns and received treatment at multidisciplinary feeding disorders programs. All of the studies involved behavioral interventions—no well-controlled studies that evaluated feeding interventions by other theoretical perspectives or clinical disciplines met inclusion criteria. Treatment settings included hospital inpatient units (43.8% of the studies) followed by home/school setting (29.2%), day treatment programs (16.7%), outpatient clinics (10.4%) and residential facilities (6.3%). The results of the review indicated that behavioral intervention was associated with significant improvements in feeding behavior. This review evaluated behavioral interventions used in feeding disorder programs; however, the settings for the treatment was not compared or evaluated. Silverman et al. (2013) reported on a retrospective study of a cohort of 77 children diagnosed as having a feeding disorder, gastrostomy tube (GT) feeding dependence (>1 year), and an inability to maintain acceptable growth via oral feeding that completed a tube weaning protocol in an inpatient behavioral feeding program. In the inpatient program, children received treatment from a pediatric psychologist at each meal three times per day, seven days per week, until discharged with at least one parent was required to be present at all mealtimes. Measures for analysis included About Your Child's Eating, the Mealtime Behavior Questionnaire, and the Parenting Stress Index Short Form. The mean duration of hospitalization was 10.9 days. At discharge, 51% of patients needed no GT feeding, and after one year after discharge an additional 12% needed no GT feeding. Limitations of the

study include the retrospective data collection and incomplete ascertainment of follow-up data resulting in a decreasing sample size through 12 months of follow-up, heterogeneity of the patient populations and the psychological measures were dependent upon parent report.

Multidisciplinary Approach

Many studies have demonstrated the benefits of such a multidisciplinary approach. Manikam and Perman (2000) support that assessment and treatment are best conducted by an interdisciplinary team of professionals. They believe that, at a minimum, the team should include a gastroenterologist, dietitian, behavioral psychologist, and occupational and/or speech therapist. Intervention should be comprehensive and include treatment of the medical condition, behavioral modification to alter the child's inappropriate learned feeding patterns, and parent education and training in appropriate parenting and feeding skills. A majority of feeding problems can be resolved or greatly improved through medical, oral motor, and behavioral therapy. Behavioral feeding strategies have been applied successfully even in organically mediated feeding disorders. To avoid iatrogenic feeding problems, initial attempts to achieve nutritional goals in malnourished children should be via the oral route. The need for exclusive tube feedings should be minimized. (Manikam and Perman, 2000).

Rommel et al. (2003) described the multidisciplinary treatment of 700 infants and young children with feeding disorders, reporting that almost 50% of the study subjects presented with a combination of medical (for example, GERD, neurologic or other problem) and oral (for example, oral motor issues, sensory problems, etc.) pathology underlying their disorder. They found a significant relationship was found between the type of feeding problem and age. Infants born preterm and/or with a birthweight below the tenth percentile for gestational age are at greater risk for developing feeding disorders. There were also a substantial number of individuals presenting with combined oral-behavioral (for example, food avoidance, tantrums, etc.), and medical-behavioral conditions as well. These individuals were treated by a team approach, with 73.1 % of the individuals experiencing significant benefits beyond 2 months to 5 years. Authors conclude that a multidisciplinary team approach is essential for assessment and management because combined medical and oral problems are the most frequent cause of pediatric feeding problems. In a review of the literature on feeding problems of infants and toddlers, Bernard-Bonnin (2006) note that there is often overlap between classifications of feeding problems, which includes structural abnormalities, neurodevelopmental disabilities, and behavioral disorders. A medical approach also needs an evaluation of diet and an assessment of the interaction between parent and child. Treating medical or surgical conditions, increasing caloric intake, and counseling about general nutrition can alleviate mild to moderate problems. Thus, feeding problems in early childhood often have multi-factorial causes with a behavioral component. The author states that more complicated cases should be referred to multidisciplinary teams, including behavioral therapy to foster appropriate behavior and

discourage maladaptive behavior. Greer et al. (2008) investigated the impact of an intensive interdisciplinary feeding program on caregiver stress and child outcomes of children with feeding disorders across 3 categories: (1) tube dependent, (2) liquid dependent, or (3) food selective. Outcomes for caregiver stress levels, child meal-time behaviors, weight, and calories were examined at admission and discharge for 121 children. Analysis examined differences pre- and post-treatment and across feeding categories. Caregiver stress, child meal-time behaviors, weight, and caloric intake improved significantly following treatment in the intensive feeding program, regardless of category placement. The authors concluded that regardless of a child's medical and feeding history, an intensive interdisciplinary approach significantly improved caregiver stress and child outcomes. This study provides support that regardless of a child's medical and feeding history, an intensive interdisciplinary approach significantly improves caregiver stress and child outcomes. Cincinnati Children's Hospital Medical Center's best evidence statement (BESt) on "Behavioral and oral motor interventions for feeding problems in children" (2013) recommended that an intensive feeding program model that combines oral motor and behavioral interventions may be used with children with severe feeding problems to increase intake.

Williams et al. (2017) conducted a retrospective cohort controlled study design to compare outcomes of outpatient multidisciplinary intensive feeding therapy (IFT) program (n=23) who completed the 5-week IFT program to traditional therapy (TT) (n=22) of single-discipline, once weekly feeding therapy to reduce enteral tube nutrition (ETN) dependence in medically complex young children. The children in the IFT cohort experienced a median reduction in ETN dependence of 49% (34.5-58.5%) compared with a median reduction of 0% (0-25%) for TT ($p>0.0001$) by the conclusion of the 5-week program. Sharp et al. (2017) reported on a systematic review and meta-analysis of program outcomes for children receiving intensive, multidisciplinary intervention for pediatric feeding disorders. The review included 11 studies involving 593 patients with nine retrospective articles and two studies with randomized controlled trials. All samples involved children with complex medical and/or developmental histories who displayed persistent feeding concerns requiring formula supplementation. Behavioral intervention and tube weaning represented the most common treatment approaches. The core disciplines included in the care included psychology, nutrition, medicine, speech-language pathology and occupational therapy. The overall effect size for percentage of patients successfully weaned from tube feeding was 71% (95% CI 54%-83%). Treatment gains continued following discharge, with 80% of patients (95% CI 66%-89%) weaned from tube feeding at last follow-up. Treatment also was associated with increased oral intake, improved mealtime behaviors, and reduced parenting stress. The authors concluded that results indicate intensive, multidisciplinary treatment holds benefits for children with severe feeding difficulties.

Sharp et al. (2020) assessed characteristics and outcomes of young children receiving intensive multidisciplinary intervention for chronic food refusal and feeding tube

dependence. Of 229 patients admitted during the 5-year period, 83 met the entry criteria; 81 completed intervention (98%) and provided outcome data (46 males, 35 females; age range, 10-230 months). All patients had complex medical, behavioral, and/or developmental histories with longstanding feeding problems (median duration, 33 months). At discharge, oral intake improved by 70.5%, and 27 patients (33%) completely weaned from tube feeding. Weight gain (mean, 0.39 ± 1 kg) was observed. Treatment gains continued following discharge, with 58 patients (72%) weaned from tube feeding at follow-up. Authors concluded that findings support the effectiveness of their intensive multidisciplinary intervention model in promoting oral intake and reducing dependence on tube feeding in young children with chronic food refusal. Further research on the generalizability of this intensive multidisciplinary intervention approach to other specialized treatment settings and/or feeding/eating disorder subtypes is warranted.

Lagatta et al. (2021) compares healthcare use and parent health-related quality of life (HRQL) in 3 groups of infants whose neonatal intensive care unit (NICU) discharge was delayed by oral feedings. This was a prospective, single-center cohort of infants in the NICU from September 2018 to March 2020. After enrollment, weekly chart review determined eligibility for home nasogastric (NG) feeds based on predetermined criteria. Actual discharge feeding decisions were at clinical discretion. At 3 months' post discharge, authors compared acute healthcare use and parental HRQL, measured by the PedsQL Family Impact Module, among infants who were NG eligible but discharged with all oral feeds, discharged with NG feeds, and discharged with gastrostomy (G) tubes. NICU days saved by home NG discharges were calculated. Among 180 infants, 80 were orally fed, 35 used NG, and 65 used G tubes. Compared with infants who had NG-tube feedings, infants who had G-tube feedings had more gastrointestinal or tube-related readmissions and emergency encounters, and orally-fed infants showed no difference in use. Multivariable adjustment did not change these comparisons. Parent HRQL at 3 months did not differ between groups. Infants discharged home with NG tubes saved 1574 NICU days. Authors concluded that NICU discharge with NG feeds is associated with reduced NICU stay without increased post discharge healthcare use or decreased parent HRQL, whereas G-tube feeding was associated with increased post discharge healthcare use.

Ostadi et al. (2022) sought to examine if a combined program of NNS and SE compared with a program that only involves NNS would be more effective on oral feeding readiness of premature infants. This randomized controlled trial was conducted in a neonatal intensive care unit (NICU). 45 preterm infants were recruited in three groups. In the group I, infants were provided with NNS twice a day. The group II received a program that involved 15 min of NNS and 15 min of SE, daily. Both interventions were provided 10 days during two consecutive weeks. The group III, control group, just received the routine NICU care. All infants were assessed by functional oral feeding outcome measures including postmenstrual age (PMA) at the start of oral feeding, PMA at full oral feeding, transition time (days from start to full oral feeding), PMA at discharge time and also the

infant's dependency on tube-feeding at discharge time after interventions. Also, all infants were assessed via Preterm Oral Feeding Readiness Scale (POFRAS) before and after intervention. No significant differences were observed in the PMA mean at start of oral-feeding, full oral-feeding, discharge time and the mean of transition time. Compared to the control group, more infants in the group II were discharged without tube-feeding. The mean of POFRAS was significantly higher in both groups I and II compared to the group III. This score was, however, not statistically different between the groups I and II. Authors concluded that both studied interventions were superior to routine NICU care in enhancing the oral feeding readiness of preterm infants based on the POFRAS score. The studied combined program of NNS and SE, and not NNS program, could significantly increase the number of discharged infants without tube-feeding compared to control group.

Patel et al. (2022) evaluated the effectiveness of an interdisciplinary home-based feeding program, which is a unique service delivery model. Data were provided on oral intake, tube feeding elimination, and weight for patients who were dependent on tube feedings (n = 78). Weight data were collected for patients who showed failure to thrive (n = 49). Number of foods consumed and percentage of solids were collected for patients who were liquid-dependent (n = 23), and number of foods consumed were collected for patients who were food-selective (n = 61). For patients dependent on tube feedings, 81% achieved tube feeding elimination. Tube elimination was achieved after 8 months of treatment on average. All failure-to-thrive patients showed weight gain from baseline to discharge. For liquid-dependent patients, there was an increase in foods consumed from 2 foods at admission to 32 foods at discharge. For food selective patients, there was an increase from 4 foods at admission to 35 foods at discharge. For all dependent variables, results showed statistical significance and a large-sized effect. Authors concluded that these data show that an intensive interdisciplinary home-based program can be successful in treating complex feeding problems in children.

Neuromuscular Re-education/Electrical Stimulation and Swallowing

Electrical stimulation for the treatment of swallowing impairments is among the most studied swallowing interventions in the published literature, yet many unanswered questions about its effectiveness remain. In a meta-analysis, Carnaby-Mann et al. (2007) evaluated the effect of neuromuscular electrical stimulation (NMES) on swallowing rehabilitation. A significant summary effect size was noted for use of NMES for swallowing; however, heterogeneity of studies was significant and problematic to confirm results. The authors concluded that this preliminary meta-analysis revealed a small but significant summary effect size for NMES for swallowing. However, because of the small number of studies and low methodological grading for these studies, caution should be taken in interpreting this finding. They stated that these results support the need for more rigorous research in this area. Clark et al. (2009) reviewed the literature examining the effects of NMES on swallowing and neural activation. Out of 899 citations initially identified for the broad review of OMEs, 14 articles relating to NMES qualified for

inclusion. Most of the studies (10/14) were considered exploratory research, and many had significant methodological limitations. The authors concluded that this systematic review revealed 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. The authors stated that additional research is needed to document the effects of such protocols on swallowing performance. Christiaanse et al. (2011) compared changes in swallowing function in pediatric patients with dysphagia who received NMES to a control group who received usual oral motor training and dietary manipulations without NMES. Children were classified into 2 groups based on the etiology of their dysphagia (primary versus acquired). 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. However, there may be subgroups of children that will improve with NMES treatment.

Epperson et al. (2019) reviewed neuromuscular development, summarized the current body of evidence describing the use of neuromuscular electrical stimulation (NMES) therapy in infants, and identified possible contraindications for the use of NMES in the neonate and young infant. After a review of the literature describing neuromuscular development, we created a timeline of the developmental processes. Key milestones were determined, and a literature search was conducted to identify potential effects of electrical stimulation on this process. Current evidence supporting the use of NMES in the pediatric population is limited and of poor quality. Contraindications of the use of NMES in the neonate and young infant were identified, including (a) inhibited expression of the neural cell adhesion molecule that is vital for neuromuscular development, (b) alteration of muscle fiber type metabolic profile away from intended muscle fiber type morphology, and (c) interruption of postsynaptic acetylcholine receptor synthesis during neuromuscular junction development. Authors concluded that the use of NMES for the treatment of dysphagia in the neonate and young infant may influence early neuromuscular development in a manner that is not currently well understood. Future research is needed to further understand the effects of NMES on the developing neuromuscular system.

Propp et al. (2022) aimed to determine the effectiveness of neuromuscular electrical stimulation (NMES) for treatment of oropharyngeal dysphagia in children. Studies of children (≤18 years) diagnosed with oropharyngeal dysphagia using NMES in the throat/neck region were included. A meta-analysis was not conducted due to clinical heterogeneity in studies. Ten studies were included (5 RCTs, 4 case series, 1 cohort study; including 393 children, mean or median age below 7 years, including children with neurologic impairments). In all studies, swallowing function improved after NMES treatment. Eight of 10 studies reported on the child's feeding ability, and, with one exception, there was improvement in feeding ability. Few studies reported on health status (N=2), impact on caregiver (N=1), adverse events and harms (N=2), and child's quality of life (N=1). In most studies, outcome follow-up was less than 6 months. The studies

demonstrated moderate to high risk of bias. Authors concluded that NMES treatment may be beneficial in improving swallowing function for children with dysphagia, however, given the quality of the studies, inadequate outcome reporting, and short follow-up duration, uncertainty remains. Well-designed RCTs are needed to establish its effectiveness before its adoption in clinical practice.

Currently, there is insufficient evidence to support the use of electrical stimulation in the treatment of feeding/swallowing disorders. Well-designed studies are needed to determine the effectiveness of electrical stimulation for these disorders.

PRACTITIONER SCOPE AND TRAINING

Practitioners should practice only in the areas in which they are competent based on their education, training and experience. Levels of education, experience, and proficiency may vary among individual practitioners. It is ethically and legally incumbent on a practitioner to determine where they have the knowledge and skills necessary to perform such services and whether the services are within their scope of practice.

It is best practice for the practitioner to appropriately render services to a member only if they are trained, equally skilled, and adequately competent to deliver a service compared to others trained to perform the same procedure. If the service would be most competently delivered by another health care practitioner who has more skill and training, it would be best practice to refer the member to the more expert practitioner.

Best practice can be defined as a clinical, scientific, or professional technique, method, or process that is typically evidence-based and consensus driven and is recognized by a majority of professionals in a particular field as more effective at delivering a particular outcome than any other practice (Joint Commission International Accreditation Standards for Hospitals, 2020).

Depending on the practitioner's scope of practice, training, and experience, a member's condition and/or symptoms during examination or the course of treatment may indicate the need for referral to another practitioner or even emergency care. In such cases it is prudent for the practitioner to refer the member for appropriate co-management (e.g., to their primary care physician) or if immediate emergency care is warranted, to contact 911 as appropriate. See the *Managing Medical Emergencies (CPG 159 – S)* clinical practice guideline for information.

References

American Medical Association. (current year). Current Procedural Terminology (CPT) Current year (rev. ed.). Chicago: AMA.

American Medical Association. (current year). ICD-10-CM. American Medical Association.

Arvedson JC. Assessment of pediatric dysphagia and feeding disorders: clinical and instrumental approaches. Dev Disabil Res Rev. 2008;14(2):118-127. doi:10.1002/ddrr.17

Babbitt RL, Hoch TA, Coe DA, et al. Behavioral assessment and treatment of pediatric feeding disorders. J Dev Behav Pediatr. 1994;15(4):278-291

Bernard-Bonnin AC. Feeding problems of infants and toddlers. Can Fam Physician. 2006;52(10):1247-1251

Byars KC, Burklow KA, Ferguson K, O'Flaherty T, Santoro K, Kaul A. A multicomponent behavioral program for oral aversion in children dependent on gastrostomy feedings. J Pediatr Gastroenterol Nutr. 2003;37(4):473-480. doi:10.1097/00005176-200310000-00014

Carnaby-Mann GD, Crary MA. Examining the evidence on neuromuscular electrical stimulation for swallowing: a meta-analysis. Arch Otolaryngol Head Neck Surg. 2007;133(6):564-571. doi:10.1001/archotol.133.6.564

Christiaanse ME, Mabe B, Russell G, Simeone TL, Fortunato J, Rubin B. Neuromuscular electrical stimulation is no more effective than usual care for the treatment of primary dysphagia in children. Pediatr Pulmonol. 2011;46(6):559-565. doi:10.1002/ppul.21400

Cincinnati Children's Hospital Medical Center. Best evidence statement (BESt). Behavioral and oral motor interventions for feeding problems in children. Cincinnati, OH: Cincinnati Children's Hospital Medical Center; July 15, 2013

Clark H, Lazarus C, Arvedson J, Schooling T, Frymark T. Evidence-based systematic review: effects of neuromuscular electrical stimulation on swallowing and neural activation. Am J Speech Lang Pathol. 2009;18(4):361-375. doi:10.1044/1058-0360(2009/08-0088)

Cole SZ, Lanham JS. Failure to thrive: an update. Am Fam Physician. 2011;83(7):829-834

Crosby J, Duerksen DR. A prospective study of tube- and feeding-related complications in patients receiving long-term home enteral nutrition. JPEN J Parenter Enteral Nutr. 2007;31(4):274-277. doi:10.1177/0148607107031004274

Epperson HE, Sandage MJ. Neuromuscular Development in Neonates and Postnatal Infants: Implications for Neuromuscular Electrical Stimulation Therapy for Dysphagia. J Speech Lang Hear Res. 2019;62(8):2575-2583. doi:10.1044/2019_JSLHR-S-18-0502

Feeding and Swallowing Disorders (Dysphagia) in Children. Retrieved on July 1, 2023 from http://www.asha.org/public/speech/swallowing/feeding-and-swallowing-disorders-in-children/

Feeding Infants in the Child and Adult Care Food Program. Retrieved on July 3, 2023 from https://www.fns.usda.gov/tn/feeding-infants-child-and-adult-care-food-program

Field D, Garland M, Williams K. Correlates of specific childhood feeding problems. J Paediatr Child Health. 2003;39(4):299-304. doi:10.1046/j.1440-1754.2003.00151.x

Gisel E. Interventions and outcomes for children with dysphagia. Dev Disabil Res Rev. 2008;14(2):165-173. doi:10.1002/ddrr.21

Greer AJ, Gulotta CS, Masler EA, Laud RB. Caregiver stress and outcomes of children with pediatric feeding disorders treated in an intensive interdisciplinary program. J Pediatr Psychol. 2008;33(6):612-620. doi:10.1093/jpepsy/jsm116

Kennedy Krieger Institute. Retrieved July 15, 2022 from https://www.kennedykrieger.org/

Kodak T, Piazza CC. Assessment and behavioral treatment of feeding and sleeping disorders in children with autism spectrum disorders. Child Adolesc Psychiatr Clin N Am. 2008;17(4):887-xi. doi:10.1016/j.chc.2008.06.005

Lagatta JM, Uhing M, Acharya K, et al. Actual and Potential Impact of a Home Nasogastric Tube Feeding Program for Infants Whose Neonatal Intensive Care Unit Discharge Is Affected by Delayed Oral Feedings. J Pediatr. 2021;234:38-45.e2. doi:10.1016/j.jpeds.2021.03.046

Lawlor CM, Choi S. Diagnosis and Management of Pediatric Dysphagia: A Review. JAMA Otolaryngol Head Neck Surg. 2020;146(2):183-191. doi:10.1001/jamaoto.2019.3622

Manikam R, Perman JA. Pediatric feeding disorders. J Clin Gastroenterol. 2000;30(1):34-46. doi:10.1097/00004836-200001000-00007

Mathisen B, Worrall L, Masel J, Wall C, Shepherd RW. Feeding problems in infants with gastro-oesophageal reflux disease: a controlled study. J Paediatr Child Health. 1999;35(2):163-169. doi:10.1046/j.1440-1754.1999.t01-1-00334.x

Nutrition Screening for Infants and Young Children with Special Health Care Needs: Spokane County, Washington. 2008. Retrieved on July 3, 2023 from http://www.doh.wa.gov/portals/1/documents/pubs/970-116_nutritionscreeningforinfantsandyoungcshcn.pdf

Ostadi M, Jokar F, Armanian AM, Namnabati M, Kazemi Y, Poorjavad M. The effects of swallowing exercise and non-nutritive sucking exercise on oral feeding readiness in preterm infants: A randomized controlled trial. Int J Pediatr Otorhinolaryngol. 2021;142:110602. doi:10.1016/j.ijporl.2020.110602

Patel MR, Patel VY, Andersen AS, Miles A. Evaluating Outcome Measure Data for an Intensive Interdisciplinary Home-Based Pediatric Feeding Disorders Program. Nutrients. 2022;14(21):4602. Published 2022 Nov 1. doi:10.3390/nu14214602

Propp R, Gill PJ, Marcus S, et al. Neuromuscular electrical stimulation for children with dysphagia: a systematic review. BMJ Open. 2022;12(3):e055124. Published 2022 Mar 25. doi:10.1136/bmjopen-2021-055124

Rogers B. Feeding method and health outcomes of children with cerebral palsy. J Pediatr. 2004;145(2 Suppl):S28-S32. doi:10.1016/j.jpeds.2004.05.019

Rommel N, De Meyer AM, Feenstra L, Veereman-Wauters G. The complexity of feeding problems in 700 infants and young children presenting to a tertiary care institution. J Pediatr Gastroenterol Nutr. 2003;37(1):75-84. doi:10.1097/00005176-200307000-00014

Schädler G, Süss-Burghart H, Toschke AM, von Voss H, von Kries R. Feeding disorders in ex-prematures: causes--response to therapy--long term outcome. Eur J Pediatr. 2007;166(8):803-808. doi:10.1007/s00431-006-0322-x

Schreck KA, Williams K, Smith AF. A comparison of eating behaviors between children with and without autism. J Autism Dev Disord. 2004;34(4):433-438. doi:10.1023/b:jadd.0000037419.78531.86

Sharp WG, Jaquess DL, Morton JF, Herzinger CV. Pediatric feeding disorders: a quantitative synthesis of treatment outcomes. Clin Child Fam Psychol Rev. 2010;13(4):348-365. doi:10.1007/s10567-010-0079-7

Sharp WG, Volkert VM, Scahill L, McCracken CE, McElhanon B. A Systematic Review and Meta-Analysis of Intensive Multidisciplinary Intervention for Pediatric Feeding Disorders: How Standard Is the Standard of Care?. J Pediatr. 2017;181:116-124.e4. doi:10.1016/j.jpeds.2016.10.002

Sharp WG, Volkert VM, Stubbs KH, et al. Intensive Multidisciplinary Intervention for Young Children with Feeding Tube Dependence and Chronic Food Refusal: An Electronic Health Record Review. J Pediatr. 2020;223:73-80.e2. doi:10.1016/j.jpeds.2020.04.034

Sharp WG, Silverman A, Arvedson JC, Bandstra NF, Clawson E, Berry RC, McElhanon BO, Kozlowski AM, Katz M, Volkert VM, Goday PS, Lukens CT. Toward Better Understanding of Pediatric Feeding Disorder: A Proposed Framework for Patient Characterization. J Pediatr Gastroenterol Nutr. 2022 Sep 1;75(3):351-355. doi: 10.1097/MPG.0000000000003519. Epub 2022 Jun 10. PMID: 35687655; PMCID: PMC9365260.

Silverman AH. Interdisciplinary care for feeding problems in children. Nutr Clin Pract. 2010;25(2):160-165. doi:10.1177/0884533610361609

Vohr BR, Wright LL, Dusick AM, et al. Neurodevelopmental and functional outcomes of extremely low birth weight infants in the National Institute of Child Health and Human Development Neonatal Research Network, 1993-1994. Pediatrics. 2000;105(6):1216-1226. doi:10.1542/peds.105.6.1216

Williams C, VanDahm K, Stevens LM, et al. Improved Outcomes with an Outpatient Multidisciplinary Intensive Feeding Therapy Program Compared with Weekly Feeding Therapy to Reduce Enteral Tube Feeding Dependence in Medically Complex Young Children. Curr Gastroenterol Rep. 2017;19(7):33. doi:10.1007/s11894-017-0569-6