Empirically Supported Treatments for Feeding Difficulties in Young Children

Ann McGrath Davis · Amanda Bruce · Jose Cocjin · Hayat Mousa · Paul Hyman

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Abstract Pediatric feeding problems are common among children and present severe issues for families. Unfortunately, treatment outcome studies with this population are sparse. The current study reviews the literature regarding treatment studies of children with severe feeding issues, provides an overview of empirically supported treatments for children who do eat orally, and finally summarizes interventions that attempt to reintroduce oral feeding to children who have been fed by gastrostomy tube or other non-oral feeding route.

Keywords Feeding problems · Failure to thrive · Food refusal · Review

Introduction

Feeding is one of the most important early skills that a child must learn. Many parents express frustration over young children being “picky eaters,” and feeding issues frequently become a struggle for families [1]. “Picky eating” and other mild forms of feeding problems do not typically progress into serious feeding difficulties. However, for children who develop severe feeding difficulties, there are multiple medical consequences.

Feeding difficulties comprise a heterogeneous assortment of problems grouped together because of the common result. Feeding problems are often the presenting symptoms for medical diagnoses, cognitive and/or emotional disorders, developmental delays, and poor nutritional status. The multifactorial nature of feeding difficulties necessitates multidisciplinary assessment and treatment.

There are few rigorous scientific studies evaluating treatment for this population. The purpose of the current article is to review empirically supported treatments for feeding difficulties in young children (excluding neonates). The review is divided into four sections. First, we summarize causes of feeding problems. Second, we provide an overview of empirically supported treatments for children who eat by mouth. Next, we summarize interventions that attempt to re-introduce oral feeding to children who have been fed by gastrostomy tube or other non-oral feeding route. Finally, we conclude by outlining future directions for clinical research regarding treatments for feeding disorders in young children.
Feeding Difficulties

Feeding difficulties occur in 25% to 45% of healthy children and up to 80% of children with developmental delays or chronic disease [2, 3]. Serious feeding difficulties requiring medical intervention occur in 3% to 10% of children [3]. Premature infants are overrepresented among children with serious feeding difficulties [4], and improved preterm infant survival has increased the prevalence of feeding problems in older infants and toddlers [5]. In addition, severe feeding problems are more common in children with chronic medical conditions, occurring in 40% to 70% of this population [6, 7].

Feeding difficulties are caused by structural abnormalities, neurologic problems, cardiac conditions, behavioral problems, and respiratory conditions, along with gastrointestinal motility and sensory abnormalities [8-•, 9]. One group found the distribution of the most common medical diagnostic categories of children presenting to a feeding team to include neurologic (62%), mechanical/structural (53%), behavioral (43%), cardiorespiratory (34%), and metabolic (12%) causes, with most children in two or more diagnostic categories simultaneously [10]. Children referred to a feeding team are complicated [10]. Neonates with long intensive care hospitalizations may lose opportunities for learning to eat and may associate eating with pain or discomfort [9], and are more likely to present to a feeding team than children born at term [10]. Gastrostomy (G-) and gastro-jejunal (G-J) tube feeding requirements due to hollow visceral sensory hypersensitivity may persist for months or years, resulting in chronic oral food refusal. As the prevalence of tube feeding has increased, so have the challenges associated with transitioning a child from tube to oral feeding [11, 12].

Empirically Supported Treatments for Children Sustained Orally

Much of the literature regarding treatment for children with feeding problems that are mild to moderate (indicated by their ability to be sustained orally) tends to be retrospective chart reviews with specific groups of patients. For example, Smith et al. [13] conducted a retrospective chart review of 51 patients who underwent open airway reconstruction at their facility and discussed their multidisciplinary procedures for maintaining safe oral alimentation and the subsequent results. However compelling these studies may be, the fact that they are single-site retrospective chart reviews limits their generalizability, as does the fact that they are specific to children with one diagnosis or undergoing a single type of procedure.

In addition to the retrospective chart reviews of single diagnoses, some studies focus on children with a variety of medical diagnoses but who share common feeding difficulties. These studies tend to assess treatments that are behavioral in nature [14], and published results across studies suggest that the treatments tend to be successful [15]. For example, in 2007, Clawson et al. [16] assessed the use of behavioral interventions and parent education on the feeding difficulties of young children with spastic diplegic cerebral palsy. The study enrolled 18 children between 1.5 years and 4.7 years of age. The intensive intervention consisted of a full-day treatment program for an average of 5.8 weeks using oral motor therapy, reinforcement (tangible positive consequences), and extinction (ignoring). Although results suggested moderate increases in oral intake, the intensity of the program limits the feasibility and generalizability of this type of program to some sites and situations. Similar programs are available to treat a wider variety of children [17], but these programs are often inpatient or intensive outpatient day treatment, and last for months at a time, causing family inconvenience and financial stress.

Many behavioral approaches are used in successful feeding treatment [18]. Specifically, approaches used by successful programs include contingent social attention, reinforcement, punishment, appetite manipulation, stimulus control procedures, systematic desensitization, and flooding [19]. Systematic desensitization, for example, uses competing relaxation responses during exposure to a graduated hierarchy of anxiety-producing stimuli to help a patient learn to overcome a fear (in this case, a fear of eating). Specifically, for children who chronically refuse oral intake, the hierarchy would consist of a progression from being in the same room with food, to interacting with, smelling, touching, tasting, and eating the food. The patient has control over the situation and is allowed to decrease exposure or increase it, as well as being rewarded for exposure experiences by attention and reinforcement. In contrast, flooding requires a patient to experience the feared stimulus (ie, food) while escape (moving away from the food) is prevented. The goal is for the patient to experience a peak, and then a decrease, in fear response with no undesirable consequences, in order to learn that the feared item does not actually produce negative consequences. For example, the therapist would present the food on a spoon in front of the child’s mouth and not move the spoon until the child tastes the food, at which time the child would be verbally praised and tangibly rewarded.

Empirically Supported Treatments for Children Transitioning to Total Oral Intake from Non-oral Supplemental Feeds

Gastrostomy (G-) and gastro-jejunal (G-J) feeding tubes are placed in infants and children who refuse to eat or are unable to eat enough to sustain normal growth. Causes for...
oral feeding difficulties include neurologic disease, congenital heart defects, chronic pulmonary disease, renal failure, and oropharyngeal dysphagia [20]. Although often intended as temporary, short-term solutions, feeding tubes often become a permanent conduit for enteral nutrition. The decision to have a G-tube is difficult for caregivers [21]. Caregivers must cope with medical management problems, including vomiting, diarrhea, infection of the G-tube insertion site, and leakage [22]. Caregivers’ stress often increases after G-tube placement [23]. Children and parents miss mealtime socialization experiences when the child is tube fed [21]. Parents report problems related to G-tube feeding, such as sleep disruption and deprivation, restricted mobility and ability to leave home, childcare problems, negative attitudes of others toward tube feeding, and difficulties finding a place to feed [22]. G-tube placement improved quality of life for parents [24]. There is consensus that tube feeding is an excellent short-term solution to problems with oral nutrition. However, delaying the transition from tube to oral feeding has negative medical, emotional, and economic consequences [22, 25]. Developing effective treatments to facilitate the transition from gastrostomy to oral feeding is a critical step in health care for affected individuals.

Inpatient Treatments

Several inpatient protocols have been reported. Nine children (ages 1.8–5.5 years) who had been dependent on tube feeding for a range of 1 year to 4.4 years (mean=2.2±1.1 years) were admitted with their mothers for intensive inpatient behavioral treatment for oral aversion [26]. Range of inpatient stay was 5–16 days, mean duration was 11.4 days. During the treatment, operant learning principles (positive and negative reinforcement, shaping, discrimination, fading, and escape extinction) were applied to establish adaptive mealtime behaviors. Parent training was also an important component of the treatment. Impressively, at discharge, four of nine had weaned completely from gastrostomy feedings. Further, 3 months later, six of nine had weaned completely from tube feeding [26].

A multidisciplinary inpatient treatment for pathologic oral food refusal in ten children under the age of 2 years who had been nasogastric tube-fed for 7–19 months (mean=13.5 months) used a hunger provocation paradigm in stages. The protocol began with a 50% reduction in caloric intake by tube, and accepted up to 15% weight loss during the program [27]. Hospital stay ranged from 9 days to 33 days (mean 17 days). While hospitalized, all children lost weight, but the protocol was discontinued in only one child because of excessive weight loss. At the 6-month follow-up, eight of ten children were eating orally and gaining weight [27].

Although showing some promise, these inpatient treatments for the transition from tube to oral feeding have been criticized for their intensity, financial burden, and disruptive-ness of the hospital stay on the patient, caregiver, and family.

Outpatient Treatments

Very few published studies, other than case reports [28, 29], have examined the effectiveness of outpatient feeding programs for transitioning children from tube to oral feeding. This may be because of the relative dearth of multidisciplinary feeding programs, because their focus is on clinical care rather than research, and because of the heterogeneity of the patients and their feeding problems.

The only randomized outpatient study reported compared seven weekly outpatient sessions of behavior therapy to a traditional nutritional intervention for chronic oral food refusal [30]. The behavioral treatment was more effective than the traditional nutritional intervention: the behavioral group experienced a 47% success rate for transitioning children from tube to oral feeding, compared to 0% in the control group.

A unique school-based intervention integrated therapeutic feeding goals into the individualized education program for two children [31]. The program lasted an extended duration (>2 years), and involved many of the behavioral strategies described above. By the end of the program, both children (age 5 years at initiation) had transitioned from tube to oral feeding. Addressing severe feeding difficulties in the context of school is a novel idea. Defining the effectiveness of such a program will require more than a single report of two children.

Our group conducted a retrospective chart review of nine children aged 7 months to 4 years who underwent a standardized outpatient multidisciplinary treatment protocol for chronic oral food refusal [32]. At the initial visit, all nine subjects received 100% of their calories through a gastrostomy tube. Subject diagnoses were diverse (including gastroesophageal reflux disease, ring 21 chromosomal abnormality, ventricular septal defect, cerebral palsy, Down’s syndrome, and cyclic vomiting syndrome). Treatment included outpatient visits with a multidisciplinary feeding team (occupational therapist, pediatric psychologist, dietician, pediatric gastroenterologist). At the initial visit, team members ensured that each subject had mastered skills and behaviors necessary for successful eating (Tables 1 and 2). The subjects were then treated with gabapentin and/or amitriptyline, for hypothesized chronic pain, and with postpyloric tube feedings, to bypass the presumed hypersensitivity of the stomach and/or esophagus. Eight weeks later, an appetite stimulant (megesterol) was added for hunger provocation, and 5 days after this, continuous tube feedings were tapered. Megesterol was continued for 6 weeks. Patients were seen for about three 1-hour visits during the entire treatment protocol, making this one of the least burdensome published
treatments for feeding refusal. All subjects finished the protocol with no negative side effects, and all completed successfully by obtaining 100% of their caloric intake orally. Eight of the nine were able to maintain their weight over time and never required additional tube feeding. One patient with cerebral palsy had difficulty maintaining his weight without tube feeds, because of oral motor stamina issues, and therefore decreased oral intake to 50%, with the remainder still provided by gastrostomy tube.

Conclusions

Funding multidisciplinary feeding teams is challenging. Feeding teams function most effectively when multiple clinicians can meet simultaneously for patient evaluations. Unfortunately, most insurers (including Medicaid) will not allow simultaneous billing from multiple clinicians. Moreover, the medical budget now has strict limits. Reimbursing feeding team visits is often considered wasteful by insurers, who have a finite budget with priorities on curing diseases with surgical or brief medical interventions instead of supporting biopsychosocial interventions like helping a child transition from tube to oral feedings.

Feeding problems continue to be a clinical challenge for primary care physicians and pediatric gastroenterologists. Behavioral treatment programs are intensive and expensive for families, and difficult to find in local communities. Hospitalization and intensive outpatient treatment exist but cause family disruption, emotional distress, and financial burden.

Because a nutritional requirement for tube feeding inflicts continuing medical interventions, imposes medical costs, and

<table>
<thead>
<tr>
<th>Skill</th>
<th>Assessment method</th>
<th>Description</th>
<th>Supports oral skill</th>
</tr>
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<tbody>
<tr>
<td>Age-appropriate strength and coordination of the oral cavity</td>
<td>Observation Manipulation Swallow study (if necessary)</td>
<td>Adequate range of motion, strength, and coordinated movement of the lips, tongue, jaw; if safety of swallow is in question, a study will be done to assess</td>
<td>The manipulation of food, either liquid or solid, that is appropriate for the child’s developmental age or would support adequate nutrition.</td>
</tr>
<tr>
<td>Head/neck/trunk support</td>
<td>Observation Manual testing if necessary</td>
<td>Strength and control of the head, neck, and trunk to provide midline stability of the body</td>
<td>Control of the head, neck, and trunk support erect posture and alignment so that the mouth is able to manage and manipulate food and there is support surrounding the swallow.</td>
</tr>
<tr>
<td>Sensory processing</td>
<td>Observation Short Sensory Profile (McIntosh et al. [35]) Interview with family and other care givers</td>
<td>No overt sensory processing issues that interfere with daily life activities, specifically eating/feeding</td>
<td>The ability to organize sensory input supports the mouth’s ability to control and manipulate food without reaction to texture, temperature, etc. This ability, in turn, supports a safe swallow. Difficulties with sensory processing may set up food aversions that may or may not be directly related to oral skills.</td>
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<tr>
<th>Name of skill</th>
<th>Descriptor</th>
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<tr>
<td>Regular meals</td>
<td>Willingly comes to the meal at least two to three times per day.</td>
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<tr>
<td>Limited grazing</td>
<td>Child does not simply graze throughout the day, but participates in structured family mealtimes.</td>
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<tr>
<td>Same location</td>
<td>Daily meals take place in the same location.</td>
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<tr>
<td>Meal length</td>
<td>Meal length lasts 10–20 min.</td>
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<tr>
<td>Meal distractions</td>
<td>There are few distractions during mealtime (eg, TV), which occur on a routine basis. A child who requires distraction in order to take bites is not eligible.</td>
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<tr>
<td>Family mealtime</td>
<td>The child and family eat meals together on a regular basis.</td>
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<tr>
<td>Structured start and end</td>
<td>The parent dictates the start and end of the meal with a simple command such as “It’s time to eat” or “You may get down now.”</td>
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<tr>
<td>Parent behavior during meals</td>
<td>Parent behavior during meals is appropriate with limited coaxing, never any forcing of food, and no yelling or threatening.</td>
</tr>
<tr>
<td>Force feeding</td>
<td>There is never any forcing of food or other objects into the child’s mouth.</td>
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<tr>
<td>Meal demeanor</td>
<td>Child is neutral or positive in response to mealtime (voluntarily places food in mouth, or allows adult to do so) without crying or turning head away from spoon.</td>
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<tr>
<td>Good food presentation</td>
<td>Appropriate amount/variety of foods are presented in a calm, relaxed manner; feeders announce each bite.</td>
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prevents the child from experiencing the normal oral and social pleasures of eating, finding the most efficient and cost-effective methods for tube-to-oral feeding transition is crucial. Therefore, there is a need for interventions that are minimalistic in nature and disseminable to a wide variety of practitioners. Ideally, interventions should be tested with randomized controlled clinical trials. Finally, because children who present with feeding difficulties are so heterogeneous, it is possible that a variety of treatments will need to be developed or tailored to the unique needs of these subgroups of children. Therefore, future treatment outcome studies need to stratify efficacy assessment by medical diagnosis and other relevant characteristics. The continued publication of review articles on feeding problems in toddlers suggests that treatments with proven efficacy are needed [8••, 33, 34]. In the meantime, we await the progress of research to catch up with this clinical need.

Disclosure No potential conflict of interest relevant to this article was reported.

References

Papers of particular interest, published recently, have been highlighted as:
• Of importance
•• Of major importance

26. • Byars KC, Burklow KA, Ferguson K, et al.: A multicomponent behavioral program for oral aversion in children dependent on gastrostomy feedings. J Pediatr Gastroenterol Nutr 2003, 37:473–480. This study reported the effectiveness of an inpatient behavioral treatment for moving from tube to oral feeding. Although results were promising, the lack of a control group is a limitation.