

A Comprehensive, Intensive Approach to Feeding Therapy for Children with Selective Eating Habits

Background

Food selectivity is a common problem among children with developmental disabilities. It is characterized by a willingness to consume a very limited selection of foods and refusal to try novel items. In contrast to the finicky eating habits exhibited by some typically developing children, the rejection of new foods demonstrated by children with food selectivity tends to be long-term and very resistant to the intervention efforts of parents and professionals. Amongst this population, it is not uncommon to find children who eat nothing at all from the fruit, vegetable or meat categories. As a result, they may consume insufficient calories for growth and development and may not meet their nutritional requirements.

For some children, medical problems such as reflux, long-term tube feeding, cardiac or respiratory problems can contribute to food refusal. Children with autism spectrum disorder often have an extremely limited range of preferred foods. The causes for food refusal vary and it is speculated that there may be a number of sensory and environmental issues at play. Eating may be associated with discomfort or fatigue in the case of certain physiological conditions. Children may have an aversion to the smell, taste, appearance or texture of certain foods. They may also demonstrate rigidity in many facets of their interaction with the environment and prefer “sameness” whenever possible. Frequently, children with extreme food selectivity eat only certain brands, food cut into specific shapes, or served on a particular plate. Child-feeder interactions also contribute to food refusal. Children may have discovered that mealtime is one area of their lives where they can have some control. Parents may inadvertently strengthen their child’s resistance to trying novel foods by providing extra attention at mealtimes in order to persuade their child to eat. They may also enable their child to feel satiated on a limited variety of foods by preparing special meals which cater to their limited food preferences or by letting their child graze throughout the day on favourite snacks or beverages. Even the removal of a rejected food item in response to a child’s protests increases the likelihood that negative behaviours will occur again when he is presented with something new.

Challenging mealtime behaviour whenever new foods are introduced is a hallmark of the selective eater. Many children have very strong aversive reactions, characterized by throwing food, gagging, vomiting, screaming, crying, batting the spoon away and engaging in self-injurious behaviours. Contrary to the picky eating behaviour of the typically developing child, which goes away with time and repeated exposure to new foods, children with extremely limited diets require an intensive intervention program in order to develop a healthy nutritional pattern.

Many studies have been published which demonstrate the efficacy of a behaviour management approach to solving feeding problems. Most researchers implement positive reinforcement contingent upon the child’s acceptance and/or swallowing of a non-preferred food. Positive and negative reinforcement have been shown to increase the quantity and variety of foods consumed (Riordan, Iwata, Finney, Wohl, & Stanley, 1984; Patel, Piazza, Martinez, Volkert, & Santana, 2002). Prevention of escape behaviours by continuing to present the food until it is accepted

(Hoch et al., 1994; Cooper et al., 1995; Ahearn, et al., 2001; Reed et al. 2004) has been shown to accelerate the acquisition of new foods. Shaping procedures are used successfully to increase the texture of foods consumed (Luiselli & Gleason, 1987), and to progressively increase the variety of new foods consumed (Patel, Piazza, Santana, & Volkert, 2002). Gerrish and Mennella, 2001, were the first to show that systematic, daily exposure to a variety of foods increases the subsequent acceptance of a novel food in infants. Exposure was also used by Wardle et al. (2003) to successfully increase the acceptance of vegetables by 2.6 year olds. Research has also demonstrated the advisability of restricting children's access to preferred foods prior to a meal in order to increase the efficacy of positive reinforcement (Levin & Carr, 2001). Mueller, Piazza, Moore & Kelley, 2003, demonstrated a successful approach to training parents to implement behavioural feeding protocols with their children, using written protocols, rehearsal and verbal instruction.

The paediatric feeding team at the Stan Cassidy Centre for Rehabilitation has received referrals for many years for children whose physicians and parents are concerned with the limited variety and/or quantity of food consumed. The team uses behavioural approaches, which include shaping, reinforcement and extinction of food avoidance behaviours. Parents are trained in these procedures and requested to utilize them at home with therapists providing periodic follow-up. Success has been achieved in many cases, however the process is slow and requires numerous clinic visits. As a result, parents often give up before the child is eating a typical diet.

In an effort to increase the rate of progress and make it easier for the child to improve his eating habits, a rapid food acquisition protocol was recently developed by the team. This approach is suitable for children who:

- Are able to sit and attend
- Understand and can follow instructions
- Understand contingencies
- Understand social stories

All of the components of the existing approach have been maintained but several new elements have been added. The purpose of this article is to describe the revised approach.

Behavioural feeding intervention	Rapid food acquisition protocol
Diet history	Diet history
Shaping	Restriction of preferred foods
Reinforcement	Reinforcement
Escape extinction	Social story
Parent training	Shaping
Follow-up	Escape extinction
	Systematic exposure and forced choice
	Food acquisition chart
	Parent training
	Follow-up

Intervention process

The parents and child commit to a 3-day intensive feeding intervention. The family meets with a dietitian, a speech-language pathologist and/or an occupational therapist for a series of 3 to 5 feeding sessions each day, which range from 45 to 60 minutes. During each session, the child is presented with foods which he is expected to eat. Initially, one of the therapists feeds the child with the parents observing in order to minimize avoidance behaviours. As the parents become familiar with the procedures, they take over this role. The family is given a break of approximately one hour following each session. At mealtimes and during the evening, the child is permitted to eat with his parents as long as he is offered only foods that he has eaten during the therapy sessions or that were not part of his limited, pre-treatment diet.

The following is a detailed description of the components of the intervention process.

1. Diet history – determine where to start

A comprehensive diet history determines the child's nutritional status, which may highlight significant nutritional deficiencies and help to establish priorities for the introduction of new foods. It may unearth information about foods previously enjoyed by the child which have been dropped (often a good place to start with a feeding program). A diet history may also reveal patterns in texture or taste aversion or preference. It is often difficult for parents to accurately report how much their child is eating because of her eating style (grazing, eating away from the table). The child's height and weight may fall within normal ranges, but this may be largely due to the calories obtained from an excessive consumption of preferred foods or beverages. With these children, caloric intake is not typically the issue but rather their specific nutrient deficiencies.

2. Restrict currently preferred foods

The variety of foods that a child will eat increases with his level of hunger. Reducing access to preferred foods just prior to and during feeding therapy maximizes the child's willingness to try new foods. Beginning the night before the 3-day therapy appointment, parents are asked to eliminate the child's preferred foods. To ensure that the child remains adequately hydrated, water is accessible at all times.

Janet prepared Zachary for the intervention by feeding him a typical supper the day before his appointment but eliminating the milk he typically drinks throughout the evening. He also did not have breakfast the morning of his first session so that he would be relatively hungry when the intervention began.

3. Develop reinforcers

The therapy session begins with a period of structured play during which the therapists establish themselves as reinforcers. The child needs to perceive the therapists as fun and the source of pleasurable activity. A variety of foods, toys, games and activities may be introduced to determine what will be most motivating for him. The parents and in some

cases, the child, may also provide suggestions. The parents are also coached in the importance of enthusiastically praising the child when he makes the courageous effort of trying a new food. The concept of differential reinforcement, that is, a greater effort earns a greater reward, is also employed. Negative reinforcement (escape from eating a new or non-preferred food) is a very powerful reinforcer. A key component of feeding intervention is finding reinforcers which are powerful enough to motivate the child to try new foods.

Janet told us that Zachary loves to play board games, so as a reward for finishing the specified number of bites or drinks, he not only got to leave the table, but he also earned 5 minutes of game play. A variety of games were used to prevent boredom and he was able to choose his partner. If the 5 minutes elapsed before the game was finished, it was set aside and continued following the next trial. As an extra bonus, he received 2 additional minutes of game time if he tasted a new food the first time it was presented.

4. Establish compliance with basic instructions through the use of social stories, visual supports (First job, then reward card) and compliance drills.

Compliance with adult requests is an essential skill for children undergoing feeding intervention. We use several strategies to promote continued compliance throughout the process:

A social story outlining the therapy procedures and the target behaviour is written for each child. The story is tailored to meet his level of language comprehension, specific food preferences, and special interests. A photograph of the child is included to personalize it. A description of the reinforcer he will receive when he eats the specified foods is also given. The story is read at the beginning of each therapy session and once each evening, either by a therapist, the parent or the child himself. Modifications can be made at any point should the treatment approach be altered or if a specific point needs to be emphasized.

“First job, then reward” card – this type of visual support can be very effective in reinforcing the concept of contingencies. Many children respect and follow rules more consistently if they are presented visually, rather than simply being stated by an adult. A picture representing “eat” or “drink” is placed on a card following the word “first” and a picture of the reinforcer follows the word “then”. For children who read, this can be represented in text.

Compliance drills – This strategy is useful for breaking a pattern of refusal and non-compliance and building positive behavioural momentum. Rather than entering into a battle of wills when a child refuses to eat the food presented, we instruct him to carry out a short series of actions which are very easy for him to perform. Examples include imitating actions such as clapping his hands or touching his nose, repeating words, and following simple directions. The child typically complies with these tasks and is reinforced for his success. Once compliance has been established across several trials, the food can be presented again.

When Zachary first arrived, we spent some time getting him into the routine of

completing a task as a means of earning a reward. Seeing line drawings on a “First work, then game” card helped him to understand how the session was going to proceed. At first he complied but eventually we assigned a task which he was unwilling to do. The therapists then initiated a compliance drill of 4 to 5 motor imitations which were easy for Zachary. He was motivated by his success and quickly completed the original task when it was presented again immediately after the compliance drill.

A social story was written and read with Zachary prior to each subsequent intervention session to prepare him for trying new foods and make our expectations of him clear. He seemed to enjoy seeing a picture of himself in the story and when he read the sentence “I will try to eat some new foods”, he often named some of the foods he had eaten.

5. Establish compliance – teach the child to accept preferred food when instructed

Once the child has readily complied with several tasks, food is introduced. We begin with the child’s preferred foods to ensure success. It is important to note, however, that children who are very rigid in their habits may refuse to eat initially. This is probably because the food is presented as a task but it may also be due to differences in the manner the food is presented (size of pieces, utensil, method of preparation, different feeder, etc.). The child is typically instructed to eat one small piece of the food (or take a sip of a drink) in order to earn his reward. This pattern of continuous reinforcement is quite quickly faded through the use of token charts. The goal at this stage is to establish intermittent reinforcement before incorporating food choices into the program.

Using the strategy “First drink, then play”, Zachary was told that his job was to drink a small amount of milk, which he loves. Over the next several trials, he easily consumed 3 sips of milk in order to earn a brief period of play.”

6. Present a mixed array of preferred and less-preferred foods (child is not required to eat less-preferred food)

The next step is to allow the child to make a forced choice amongst several foods, at least one of which is less preferred. We have found that permitting the child to choose from a restricted array accomplishes 3 things. The first is that it exposes him to the look and smell of new foods before he is required to taste them. The second is that it provides him with a greater sense of control over the situation. Because he is permitted to choose which foods or drinks he will taste and in which order, he has the freedom to avoid those that are most aversive. Third, we have discovered that the relative ranking of the foods changes as exposure to new foods occurs. In other words, a food which was unfamiliar and unpalatable to the child early on in the process, tends to become less aversive when compared to an even newer food.

Typically, the number of different foods presented concurrently is increased to 4 to 6 on the first day of therapy. Initially, these are comprised primarily of preferred foods and those the child eats occasionally or has eaten in the past. There may be one or more tastes of each food. During each feeding trial, the child is obligated to eat all but one of the bites presented.

Once the child is eating the more familiar foods willingly, a new food - one that is similar in colour, taste and/or texture to something he already eats – is added to the array. The child is not required to eat this new food, but has the opportunity to see it a number of times and become less anxious about its presence on his plate.

Once Zachary was easily eating bites of several preferred foods, a less-preferred food, baked potato, was introduced. He protested when he saw it on his plate but became less anxious when he was told that he did not have to eat it.

7. Present a mixed array of preferred and less-preferred foods (child is required to eat one bite of less-preferred food)

The number of tastes of each food is manipulated over time so that after several exposures to a new food, the child is required to try it. For example, imagine there are 5 small pieces of food on his plate. For our purposes, we'll label them A, B, B, C and D, with D being the new food. This array may be presented to the child over several successive trials so that he is exposed to the new food. Because he is only expected to eat 4 of the bites, he can choose not to taste bite D. If he does try it, he is differentially reinforced with a highly preferred game or toy or an immediate break away from the table even if he hasn't completed the required number of bites. If he does not try food D after several exposures, the array is altered so that it contains, for example, a choice of A, B, C, D and D. The child now has no choice but to try a bite of the new food.

Zachary avoided the potato piece for 4 trials, until the choices were manipulated in such a way as he had no choice but to try it. He ate his first 3 bites quickly and then looked at the potato and stated that he did not like it. The therapist told him, "One more bite, then we play Bingo". Zachary sighed, picked up the potato, put it in his mouth and proclaimed "Mmm, that's good!"

8. Gradually increase the requirements for consumption of new food (quantity, variety)

New foods continue to be introduced over the 3 days of feeding intervention. Once the child is accepting a new food or drink quickly and with little resistance, the size of the bite or drink he is required to take is gradually increased. The primary goal is to send the child home with a repertoire of new foods which can be built upon and which can eventually be incorporated into snacks and mealtimes. In our experience, children typically try between 10 and 20 new foods over the course of their stay.

By the end of the third day, Zachary had tried a total of 18 new foods and drinks. Of these new foods, 4 had come to be preferred items and Zachary had eaten them willingly for his supper. He and his family were very pleased with his success and his parents were eager to expand his repertoire further.

9. Shaping

In order for feeding intervention to succeed, the child must learn to overcome his apprehension about trying something new. As clinicians, our role is to make the task less daunting so that the child views it as manageable. The use of “shaping” is crucial to this process. Shaping is defined as the process of reinforcing the achievement of successive approximations toward a goal. As the child’s skills improve, the expectations are increased and earlier approximations are ignored or not reinforced.

To optimize the child’s success, we typically begin by presenting foods that are relatively similar to ones he can already tolerate. Since these foods are not perceived as a challenge, the child generally eats them willingly and is immediately rewarded for his success. To maintain this behavioural momentum, we incorporate foods that the child has previously eaten, but dropped, or foods that are relatively similar in taste, texture and/or appearance to those he prefers. Tiny portions of the new foods are presented initially (e.g. a piece of finely diced carrot, a sip of milk) and the size of the pieces is very gradually increased as it becomes more palatable to the child. It is important not to underestimate the extremely small amount of a new food which is tolerable to a selective eater. On one occasion, our clinicians cut one strawberry into fifty pieces, and still met with considerable resistance from the child. Shaping is also used to increase the number of tastes the child must swallow to earn his reinforcer.

Zachary was offered a very small piece of apple, which was a food he had stopped eating 6 months before. He was reluctant to try it at first, but when we failed to respond to his protests, sighed and ate it. During the next hour, we gradually increased the size of the pieces presented at each trial until Zachary was quickly and easily eating a quarter of an apple.

10. Escape extinction

It is widely believed that food refusal and other mealtime problems are primarily maintained by negative reinforcement. In other words, by being uncooperative at mealtimes, children succeed in escaping from eating, and this is highly reinforcing. Escape extinction is a process by which the child’s attempts to escape from eating are ignored and therefore rendered unsuccessful. Recently a number of careful studies have demonstrated that escape extinction is the most effective tool available to increase consumption of non-preferred foods, although positive reinforcement (access to preferred foods, toys and attention) improves compliance and reduces the level of problem behaviours during mealtime, particularly when the quality of the positive reinforcer is relatively high.

Escape extinction is often referred to as non-removal of spoon (NRS). Simply, it means that once the bite is presented (or the child is requested to eat a certain number of bites) no attention or break is forthcoming until he complies. Although initially this results in an extinction burst, which is an escalation in the child’s attempts to escape from eating, before long, he realizes that protesting is futile and that the quickest way to escape from the feeding situation is to eat the bite offered. Since this can be a fairly unsettling process for parents to watch, it is important that they be adequately prepared for what may happen. Parents should

be informed that the child may cry, bat at the spoon, turn away, spit, gag, or even vomit, but that you will not give in. If the food is knocked off the spoon or spit out, another bite will be presented. Only consumption of the food will result in the child leaving the table. Fortunately, the duration of an extinction burst can be greatly reduced by careful planning and preparation (see strategies 2 through 9 above).

Zachary had become quite familiar with the rhythm of the feeding therapy sessions and was readily eating a number of previously dropped foods, for which he received play breaks and sips of his favourite drinks. However, green vegetables had never been accepted, and the dietitian suggested that this would be an appropriate addition to his diet. When a very small amount of green bean was presented, Zachary refused verbally and blocked the spoon from entering his mouth. The therapist stated the rule once “(First take a bite, then play”) then sat quietly with the spoon approximately 5 cm from his mouth. Occasionally, Zachary succeeded at knocking the bean off the spoon, but it was quickly and quietly replaced by the therapist, who continued to wait without any outward appearance of annoyance or frustration. After 20 minutes, Zachary sighed, leaned forward and ate the bite. He was immediately congratulated and given his 5-minute break. When break time was over, he returned to the table and was offered green bean again. This time he protested for 2 minutes and then ate the bean. On the third trial, he ate it immediately and was given the enhanced reinforcement of a one-hour break.

11. Train the parents

Training is a key component of feeding intervention since it is the parents who must continue this process at home. Once the child is comfortable being fed by a therapist and his parents have become familiar with the feeding procedures, one of them is asked to take on the role of feeder and reinforcer. Ongoing coaching is provided to assist the mother or father in understanding the nuances of shaping, escape extinction, etc., dealing with food avoidance behaviours and fine-tuning his or her skills. Over time, the therapists fade their assistance until the parent(s) are conducting the sessions independently.

In some cases, the child may have another intervenor working with him, either at home, in daycare or at school, who will also be carrying out feeding intervention. Whenever possible, this intervenor also attends the feeding intervention and receives training as well.

By the end of the second day, Zachary’s mother Janet was substituted as feeding therapist. The therapist sat near her and provided suggestions and encouragement as needed. Initially, Janet found managing the food, token system and reinforcers a challenge, but as she gained experience with the routine, her confidence grew. On the final day, Janet conducted the sessions independently while the therapists watched through an observation window.

12. Homework – Daily feeding therapy

Structured feeding intervention sessions should continue until the child is eating and drinking

a nutritionally adequate variety and quantity at meal and snack times. To that end, parents and other caregivers are asked to carry out 2 to 3, 15–20 minute sessions per day, utilizing the procedures they have been taught. Since there is less time for reinforcement in these shorter sessions, rewards such as a bite of a preferred food or a brief period of play (about 20 seconds) are recommended. Some older children prefer to earn points toward a bigger reward at the end of the feeding session, later in the day or even after several days. The child's ability to delay gratification in this way will be evident in the rate of his progress. For some children, a more immediate, concrete reinforcer is necessary to motivate them to attempt what, for them, is a very challenging task.

In the context of a busy family routine, it may not be feasible for parents to wait out a lengthy extinction burst should one occur. Therefore, if the child is refusing to eat when the allotted feeding therapy time elapses, parents are counseled to simply end the session without comment, and of course, without providing a reinforcer. The child should receive nothing else to eat until the next scheduled meal or therapy time.

Prior to the family's departure, the dietitian provides nutritional recommendations. For example, non-nutritious, preferred foods are typically eliminated or allowed only rarely. The quantity of nutrient-dense favourites is limited to acceptable amounts to maximize the child's appetite for new foods. Based on the analysis of which food groups or nutrients are missing from his diet, guidelines regarding the types of food that should be the focus of intervention are also given. It is suggested that one new food item should be introduced every day or two to continue to build the child's acceptance of new tastes. Furthermore, all new foods must be presented on a regular basis, both to increase the volume the child will accept and to maintain his acceptance of them. At mealtimes, the child is expected to sit at the table with his family and is served a plate containing several foods that he has eaten in therapy, including some which are somewhat preferred and others that present more of a challenge. Because this is mealtime, not therapy, he is not required or pressured to eat. If he does, he should be enthusiastically reinforced. If he does not, no other food is available until the next scheduled meal or therapy session.

Janet determined that she could conduct 2 treatment sessions a day with Zachary, one when he arrived home from school and another about an hour after supper. His teacher assistant would carry out a third session mid morning. Because Zachary loves board games, it was decided that each bite of food would earn him 1 minute of game play with his partner of choice. It was felt that this would minimize his stalling behaviour, since the more bites he ate, the longer he could play his favourite games.

Prior to his appointment, Zachary ate French fries and chicken nuggets at least once a day. He was told that from this point on, these foods would no longer be kept in the house. Instead, he would be permitted to go to McDonalds once a month as a treat. He and his mother decided to schedule this date ahead of time and record it on a calendar in the kitchen so he would know how long he had to wait. The dietitian also told Zachary and his mom that he would be allowed only three, 8-ounce glasses of milk a day, instead of the 2 liters he typically drank.

13. Follow-up

Maintaining the structure and routine of feeding therapy is very demanding and parents require ongoing support and guidance for their efforts to be successful. Even parents who do an excellent job of carrying out therapy during the 3-day intensive intervention often encounter obstacles at home. The child may assume that the new food rules do not apply in this setting and return to his engrained patterns of refusal when he returns home. Parents must incorporate the new structure into their busy lives and contend with siblings, grandparents, etc. who have difficulty ignoring the child's refusal behaviour or withholding favourite foods. As a rule, a therapist contacts parents one week following their appointment for intensive intervention, to monitor their progress, assist with problem solving and modify recommendations if needed.

Additional supports

Token systems are employed as a way of decreasing the rate of reinforcement. They signal to the child the number of bites he needs to eat or sips he must drink in order to earn his reward. Initially, a small number of tokens may be used (e.g. 2 or 3) but over time, the reinforcement schedule is further thinned by increasing the quantity of tokens. Typically, children quickly grasp the concept of the tokens and soon take over the role of moving a token each time they take a bite.

A timer is used to signal the end of the reinforcement period and the return to the task of eating. For some children who are very anxious, we have also set a timer so they can monitor the length of time remaining in the therapy session.

A large, colourful food acquisition chart is posted near the child so he can track the number of new foods he has tried. Each time a new food or drink is introduced, a corresponding picture is placed next to it. As soon as the child tastes the item, he earns the right to place the picture on the chart. For many children, this is very motivating and we encourage parents to continue this practice at home.



Summary:

An intensive 3-day feeding intervention is used with children who have chronic food refusal, at the Stan Cassidy Centre for Rehabilitation in Fredericton. This comprehensive approach incorporates reinforcement, shaping, escape extinction, restriction of preferred foods, systematic exposure, choice-making, visual supports and parent training. Results have been very rewarding. This approach appears to reduce the time required to improve the quality of the child's diet and enables the parents to continue the process at home.

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