Multicomponent Treatment for Food Selectivity in Children: Description and Case Report

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Abstract

Background: Food selectivity is common in children with and without developmental disabilities and can have negative implications for nutrition intake and family quality of life. The evidence base for effective treatment protocols is still developing. Methods: The purpose of this study was to describe a pilot, multicomponent treatment protocol for food selectivity and present several case examples using a retrospective chart review. Elements in the treatment manual included sensory integration and behavioral modification strategies, including systematic desensitization. Also, parents were educated on factors associated with food selectivity and strategies for increasing food acceptance during family meals. Results: Four children with food selectivity demonstrated increased food acceptance of previously refused foods. Incidence of negative behaviors, including gagging, vomiting, and aggressive behavior (eg, hitting, batting away spoon), during clinical meals was also evaluated. No aggressive behavior or vomiting was observed during treatment sessions, and gagging on foods at initial introduction was minimal. Conclusions: This descriptive study and case review provides information to inform treatment of food selectivity and may provide a catalyst for larger scale clinical trials. (Nutr Clin Pract. 2015;30:425-431)

Keywords

pediatrics; feeding and eating disorders of childhood; feeding behavior; food preferences; food selectivity

Background

Food selectivity has been defined as food refusal based on type, texture, taste, temperature, or appearance of food, leading to a self-restricted diet. Some children with food selectivity eat as few as 5–10 different foods, and these children frequently disrupt the family meal with their food refusal behavior. Feeding difficulties are prevalent in the pediatric population and occur in 25% of typically developing children and in up to 80% of children with developmental disabilities. Children with autism spectrum disorder are at particular risk for food selectivity, with estimates of comorbid food selectivity as high 80% in this population. Severity of food selectivity can range from life threatening, in which an alternate feeding source is needed (eg, G-tube), to more moderate. In moderate food selectivity, the child may eat up to 20 foods but refuse to eat particular food types, placing him or her at risk for deficiencies in certain nutrients.

Food selectivity poses a significant threat to optimal nutrition. Information about the nutrition implications of food selectivity is often drawn from the literature on nutrition and autism, where food selectivity may reach endemic proportions. A meta-analysis by Sharp and colleagues found deficits in the nutrition intake of children with autism (sample included children with and without food selectivity) compared with that of typically developing peers. In particular, children with autism consistently had deficiencies in intake of calcium and protein. A study by Zimmer and colleagues highlights the possibility that food selectivity may have even greater implications on nutrition than previously stated. This study compared the nutrition status of children with and without food selectivity within the autism population and found that children with autism and food selectivity had deficits in calcium, vitamin D, zinc, and vitamin B12. Since the variable that was linked to nutrition deficits in this study was food selectivity behavior, this may be the most instructive on the impact of food selectivity on nutrition in children with autism, as well as other children with food selectivity behavior.

In addition to the nutrition implications of food selectivity, this dysfunction also has implications for family mealtime satisfaction. The family meal is an important event for physical, emotional, and social nourishment. When one of the children in a family struggles with the eating process, this can be a source of stress and dissatisfaction for all family members. Qualitative research on the family meal in children with food selectivity indicates that mealtimes are characterized as stressful, dissatisfying, and overwhelming experience for this population. Families of children with food selectivity do not have the opportunity to benefit from the positive, protective

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Financial disclosure: None declared.

This article originally appeared online on November 6, 2014.

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qualities that the family meal provides other families who do not have children with feeding issues.

Due to the negative nutrition and quality-of-life implications of food selectivity, a greater understanding of underlying factors is needed. However, the causes of food selectivity (eg, genetic, physiological causes) are currently unknown. There is some evidence that food selectivity may be related to sensory overresponsivity (SOR) (ie, an excessive behavioral response to a sensory stimulus that is out of context with the demands of the environment), leading to food-related anxiety. For example, Smith and colleagues compared the food inventories of children who were identified as overresponsive to tactile stimuli with children who did not have this overresponse to touch. Findings from this study indicated that children with tactile overresponsivity ate fewer fruits and vegetables and gagged on food more frequently than did children with a typical response to tactile sensation. Suarez et al found that there was a significant difference in the SOR scores of children in severe, moderate, and typical food selectivity groups. Specifically, children who had higher scores of a parent report measure of SOR had fewer foods that they accepted as part of their regular diet.

Food selectivity treatment protocols with evidence of effectiveness are still in the early stages of development. One relatively common documented behavioral approach for treatment of food selectivity centers on using escape extinction to facilitate consumption of previously refused foods. Escape extinction is a technique that prevents the child from leaving the feeding situation until he or she has complied with the feeding specialist’s request to take a bite of a previously refused food. Refusal behavior (eg, gagging, crying, vomiting, and batting the spoon away) is ignored, and the child is prevented from “escaping” the spoon. Despite some evidence for success in clinical, often inpatient settings, this approach has been criticized as invasive and sometimes difficult for families to maintain in their natural mealtimes. Also, highly controlled feeding practices, such as escape extinction, may be contraindicated in children with less than life-threatening food selectivity. For example, high levels of adult control over what a child eats has been associated with unhealthy extremes in a child’s weight and greater food avoidance.

An additional criticism of using escape extinction is that it addresses the behavior alone without acknowledgment of features associated with food selectivity. In cases of food selectivity where the child’s survival is at stake due to failure to consume adequate nutrition, intensive treatment using escape extinction may be preferred over placement of a nonoral feeding source (eg, G-tube). But many children with food selectivity exhibit a less severe form where caloric intake is sufficient for growth but nutrition necessary for optimal brain development is threatened and family mealtimes is disrupted. Children with non-life-threatening food selectivity may benefit from an alternate, less invasive treatment approach focused on addressing factors, including SOR, associated with food selectivity.

One such alternate approach is described in a retrospective chart review by Benson and colleagues. They reviewed records for 34 clients who had received the “Sequential Oral Sensory Feeding” approach in an outpatient clinic. The treatment provided used systematic desensitization to facilitate consumption of previously refused foods in a population of children with autism and neurological and cognitive deficits. Results were mixed and indicated that almost half of the clients demonstrated a positive trend in their interaction with food (eg, eating or getting closer to eating), and half did not have an interaction with food that trended in a positive direction. There is clearly a need for additional food selectivity intervention research to provide caregivers with a menu of proven effective treatment protocols to match to their child’s individual needs and their available resources.

This article describes a pilot, holistic, manualized approach for the treatment of food selectivity in an outpatient university teaching clinic setting. This clinic provides one of the first internship experiences for occupational therapy (OT) students, and each client-OT student pair is supervised by a licensed OT. The treatment manual will be briefly described and several retrospective case examples will be presented. Research questions included the following:

- How many treatment sessions did it take for a child with moderate food selectivity to eat a food not originally in his or her repertoire?
- What was the incidence of negative behaviors (eg, gagging, vomiting, aggressive behavior) during these trials?

Methods

A retrospective chart review was performed on documentation available at the new Western Michigan University (WMU) Teaching Feeding Clinic. The Human Subjects Institutional Review Board from WMU approved this project. Parents of clients signed an informed consent document allowing researchers to access chart information prior to data analysis.

Participants

Four clients who were enrolled in the feeding program at the WMU teaching clinic during all or some of the spring, summer, and fall semesters of 2013 contributed clinical documentation to this retrospective review. Of the 6 clients who were enrolled during this time period, client charts were included for review if they had not had previous feeding treatment and had parents concerned with their eating habits. Specifically, children were enrolled in the feeding clinic if they were in the 2- to 14-year age range and had a parent report of moderate or severe food selectivity. Food selectivity was operationalized based on previous work by Suarez and colleagues. The severe classification was given to children who ate less than 10 foods as part of their regular diet and moderate for children with 11–20 foods. Children were also enrolled in the clinic if they refused at least 1 whole food group (eg, ate no fruits or vegetables).
Children were scheduled for feeding treatment sessions 1 time per week during the spring, summer, and fall semesters. No treatment was offered during university breaks, including the July through early September summer holiday. The feeding treatment described in this article was delivered in accordance with a developing treatment manual. A manualized treatment approach is necessary to ensure treatment fidelity while allowing for individualization within the standards of the manual to meet individual client needs. The treatment manual for this feeding program included the following elements.

Sensory integration. In accordance with sensory integration principles, children are provided opportunities to experience specifically chosen sensory experiences (eg, tactile, vestibular, proprioceptive) to achieve a calm-alert state before and during engagement in the clinical meal. In this approach, emphasis is placed on achieving a therapeutic alliance between the occupational therapist and client to support the child’s optimal arousal level throughout the session. This alliance is built on the therapist providing a just-right challenge for the child both during and outside of the clinical meal. Also, the therapist conveys respect for the child’s emotions and a climate of emotional safety. This is particularly important as the child challenges himself or herself to increase interaction with previously refused foods.

Systematic desensitization. Systematic desensitization or exposure therapy has been used in many contexts to address situational anxiety and phobias. Treatment involves gradually increasing exposure to the situation that causes anxiety and pairing this exposure with relaxation strategies. Systematic desensitization has been used in the treatment of hyper-sensitivity to auditory stimuli in children with autism, to reduce the anxiety response to everyday activities such as going to the dentist, and to reduce oral hypersensitivity. In the current study, children were taught to gradually work up a food interaction hierarchy to systematically desensitize them to the target foods. Simultaneously, they reflected on the sensory experience of eating to reduce the anxiety response. For example, over a series of sessions, first the child may be challenged to accept a nonpreferred food on his or her plate, then to touch the food with his or her finger, then to kiss the food goodbye, and then finally eat the food. During this process, children are asked to label each food with age-appropriate language (eg, Is the food sweet or salty? Is it yucky or yummy?). After the child reaches the food interaction hierarchy goal for the week with each food, he or she is provided the opportunity to re regulate his or her arousal level though the sensory integration strategies described above.

Behavioral modification. Several behavioral modification strategies are used when necessary to facilitate the achievement of the food interaction goals for the week.

Positive reinforcement. Children are given a sticker on each step of the food interaction ladder leading up to their interaction goal for the week. If and when they reach their food interaction goal, they are given their food ladder paper strip to later trade in for a prize at the end of the clinical meal.

Escape extinction. Children are required to achieve their food hierarchy goal for each food before getting up from the table for a “sensory break.” If the child chooses not to comply in order to meet the food interaction goal for a specific food that week, he or she must stay at the table and try with the next food. Goals are chosen to optimally challenge children each week without overwhelming them. If a child is unable to reach a food interaction goal with a specific food one week, consideration of whether to keep this current level of interaction with the food or bump the level down is made using observation and clinical reasoning skills. Focus is on maximization of success for children each week while moving them as quickly as they can tolerate toward eating previously nonpreferred foods.

Parent education and home program. Parents receive education on the feeding process and a home program to complete each week. Education topics include the relationship between sensory modulation and food acceptance, how to add a new food to your child’s diet, and creating a positive mealtime climate. Homework every week requires the child to move up the food hierarchy ladder, often 1 rung per week, with family foods. Parents are asked to report the percentage of times the child met his or her target food interaction goal for the week. When the parent reports that their child met this goal about 90% of meals, a new challenge is added. If the family did not meet the food interaction goal for the week at home, problem solving occurs to address any barriers to goal achievement. Children are discharged when the family reports that the child is able to take 1 small bite of each family food at each meal in 90% of trials and/or families express confidence at continuing this procedure without the support of the clinic staff.

Instrumentation

Food inventory. The food inventory contained 144 foods categorized by food group (ie, fruit, vegetable, dairy, protein, grain). Parents were asked to mark the foods that their child had eaten over the past month. The inventory was completed for each child before beginning feeding treatment and at discharge.

Short sensory profile. The short sensory profile is a 38-item parent report checklist designed to identify sensory processing difficulties in children. Sections on the profile include items related to SOR, including tactile sensitivity, taste/smell sensitivity, movement sensitivity, and visual/auditory sensitivity. Additional items measure sensory overresponsivity (an underresponse to a sensation that does not allow the child to meet the...
demands of the environment) and sensory seeking (excessive seeking of sensory experience that is disruptive or dysfunctional). Items are totaled for each section, and scores may fall within 1 standard deviation from the mean (typical performance), greater than 1 standard deviation below the mean (probable difference), and greater than 2 standard deviations from the mean (definite difference).

Session data collection sheet. Each week, the student therapist, in collaboration with the supervising licensed OT, fills out a session data sheet. This sheet includes documentation of the child’s achievement of the food interaction ladder level with each food and negative behaviors observed during the clinical meal, including crying, gagging on food, vomiting, and aggressive behavior in an attempt to leave the feeding situation.

Analysis

Visual analysis of data was used to observe trends and develop an overall understanding of the food acceptance process. Descriptive statistics were used to capture trends in food acceptance levels each week and behaviors associated with the clinical meal.

Results

Participants

Four clients were enrolled in the feeding group from spring 2013 to fall 2013 and met inclusion criteria. Table 1 contains client pseudonym, age, and short sensory profile classification at feeding clinic entry, and a description of each child’s food selectivity characteristics. None of the children had any known allergies to food. The total number of foods the child accepted at treatment start and discharge is included, as well as the number of fruits and vegetables. The number of sessions each child completed is also included in this table.

Per parent report, all of the children had eaten less than 14 different foods over the previous month at treatment initiation, and all of the children had sensory processing differences. Specifically, all had either definite or probable differences on the total profile, and 3 of 4 children had sensory sensitivity in at least 1 sensory modality (eg, tactile, taste/smell sensitivity).

Progression With Target Foods

Figures 1–4 document each child’s progression on the food interaction ladder hierarchy over the sessions that he or she attended. Food interaction levels range from 1 (food on plate)
Boy A’s session progress with target foods. Note: food acceptance level (1 = plate, 2 = smell, 3 = touch with utensil, 4 = touch with finger, 5 = kiss, 6 = lick, 7 = touch with teeth, 8 = eat and spit out, 9 = eat).

Girl B’s session progress with target foods. Note: food acceptance level (1 = plate, 2 = smell, 3 = touch with utensil, 4 = touch with finger, 5 = kiss, 6 = lick, 7 = touch with teeth, 8 = eat and spit out, 9 = eat).

Boy C’s session progress with target foods. Note: food acceptance level (1 = plate, 2 = smell, 3 = touch with utensil, 4 = touch with finger, 5 = kiss, 6 = lick, 7 = touch with teeth, 8 = eat and spit out, 9 = eat).

Boy D’s session progress with target foods. Note: food acceptance level (1 = plate, 2 = smell, 3 = touch with utensil, 4 = touch with finger, 5 = kiss, 6 = lick, 7 = touch with teeth, 8 = eat and spit out, 9 = eat).

to 9 (swallowed food). The number of trials before the child “accepted” the food was counted for each participant. Acceptance was defined as eating the food for 2 consecutive weeks without any negative food-related behavior.

Boy A received 22 treatment sessions before discharge. He required a range of 0–9 trials to accept a nonpreferred food for an overall average of 4.2 trials. Girl B received 12 treatment sessions and required 2–10 trials to accept a nonpreferred food with an average of 4.2 trials. Boy C received 10 treatment sessions with a range of 1–7 trials to accept a nonpreferred food with an average of 4.4 trials. Boy D received 14 treatment sessions with a range of 2–8 trials to accept a nonpreferred food. Two foods introduced were discontinued per family request before he achieved acceptance (eating for 2 consecutive weeks without negative behavior). Due to this discontinuation, no
average number of trials was calculated. Overall, visual inspection of the data for all 4 participants appeared to show that the number of trials to achieve acceptance appeared to decrease over the course of treatment.

**Negative Food-Related Behavior**

There were no incidents of crying or use of aggressive behavior in an attempt to leave the feeding situations. Boy A gagged on apple, carrot, and grape the first time he was required to consume each of these foods. Of note in the subjective portion of the documentation in his chart, the treating student therapist reported suggesting that boy A take a break from eating the rest of the apple slice after he gagged several times. After which, according to the notes, he responded, “Back off, I can do this.” Girl B gagged during 2 sessions (sessions 10 and 11) while attempting to eat more than 1 bite of a green bean. No negative food-related behavior for boy C or boy D was recorded.

**Discussion**

There is a need to provide families with options for treating food selectivity to match their individualized needs. The evidence base contains information supporting the use of a behavioral approach using escape extinction to treat food selectivity. However, some caregivers may not be comfortable with forcing their child to remain in a feeding situation that is causing him or her to gag, vomit, or exhibit aggressive behavior to try to escape. Therefore, this approach may not allow for the generalization of skills to the home where the parent must facilitate eating. Also, this treatment approach is often delivered in a hospital or intensive day treatment programs that are expensive and time-consuming, and some families may not have resources to allow participation. The purpose of this article was to describe a pilot manual for treatment of food selectivity that uses multiple strategies to facilitate consumption of previously refused foods. Treatment included elements to address the child’s ability to modulate his or her arousal level during the clinical meal, address food refusal behavior through systematic desensitization, and provide positive reinforcement and escape extinction when necessary to move the child toward session food interaction goal. In addition, parent education was provided to facilitate generalization of treatment strategies to the home setting. The goal of this intervention was for participants to eat foods that they previously refused in the clinic and home environments.

All of the children included in the retrospective chart review were able to eat previously refused foods without incident of significantly disruptive behaviors. They all showed a positive trend in food acceptance over a relatively small number of treatment sessions. The children in this study were discharged after parents reported that they were able to facilitate their child taking at least 1 bite of every family food at every meal. For some children with non-life-threatening food selectivity, this emerging approach may provide a cost-effective alternative to the intensive and often invasive treatment protocols that center on escape extinction, requiring the child to immediately eat nonpreferred foods before leaving the feeding situation. Also, adding the behavioral modification elements (positive reinforcement and escape extinction from a just-right challenge food interaction goal) may facilitate food acceptance faster than an approach that uses systematic desensitization alone.

Due to the characteristics of the sample in this study, the pilot nature of this treatment approach, and the retrospective chart review methodology, several limitations to this study exist. First, the number of case examples described in this study was very small, and children in the sample all exhibited food selectivity behavior that was moderate. This type of approach may not be adequate for children with severe food selectivity. Physiological factors such as palate sensitivity (eg, anemia), food allergies/intolerances, and/or gastrointestinal deficits were not reported by parents of study children but were also not specifically evaluated as possible causes of food selectivity. Also, in the future, it would be helpful to have a dietitian evaluate nutrition status pre- and posttreatment. This is a direction for future research. This was a retrospective chart review that did not allow for independent variable manipulation. Therefore, it is impossible to determine which treatment elements were necessary to effect change in food acceptance, and without a control group, changes could have been due to maturation. However, this study may provide a starting place for future prospective work that assesses treatment for food selectivity using a holistic, manualized approach developed using multiple theoretical frameworks.

In conclusion, this study provides an initial description of some of the elements that may form the basis of a relatively inexpensive treatment protocol to address food selectivity without inducing significantly disruptive negative behaviors. More work is needed to determine which elements of this protocol are necessary to facilitate food acceptance. Also, use of this model with a larger sample with varying levels of food selectivity is needed to determine if this model can be effective with children with more severe levels of food selectivity.

**References**


