National Pediatric Cardiology
Quality Improvement Collaborative

Behavior Interventions

Key Points:

- Typically for children ages 2 years and up
- For children demonstrating ongoing feeding refusal behavior/picky eating
- Psychologist or BCBA will provide the service
- Will involve antecedent strategies such as appetite manipulation, texture fading
- Will involve consequence strategies such as positive and negative reinforcement, escape extinction

The use of behavior interventions in tube weaning is a 'Key Ingredient' found in an extensive literature review. Behavioral feeding studies typically include children aged 2 years and beyond with children occasionally at younger ages. Consideration for the foods that are developmentally-appropriate for the child is very important.

Below, we will detail behavioral theory and related strategies that are used. For younger children, such as infants only accepting the breast or bottle, behavior strategies will be somewhat different. Antecedent strategies such as setting up a regular feeding schedule to encourage hunger, reducing tube feeding volumes to increase hunger, ensuring the caregiver has a calm presence, and so on are important. Additionally, the caregiver's presence and smell are likely important antecedents! Consequences can include calming, supportive praise during eating.

Importantly, a child's hunger cues may be reduced or absent prior to tube weaning. When trying to offer food, the child may refuse due to this lack of hunger. In the early stages of weaning when the tube feeding volume is reduced, the child will need time to learn the association between hunger and oral consumption, but luckily this tends to develop very quickly per the literature (i.e., often within one week or less). While your child is still receiving nutrition from a feeding tube, it is very important that you do not 'pressure' them to eat orally in any way. When your child is read for tube weaning, it will be an easier process if your child has already felt pleasure and safety with oral eating.

A popular approach to feeding is Ellen Satter's Division of Responsibility, which involves a caregiver responsibility to offer healthy food in adequate amounts and the child's responsibility to choose which foods and in what amounts to consume. In this approach, parents can use standard behavior strategies such as reinforcement for what the child consumes as well as extinction (e.g., lack of response) for what the child does not eat. However, some children will need more intensive behavioral intervention to progress in oral eating, which is described below.

Behavioral interventions are founded in behaviorism, which focuses on the notion that all behavior is learned (i.e., all behavior serves a purpose for the individual by providing some type reinforcement during or after the behavior). Behaviors are increased through reinforcement and decreased through punishment. Both reinforcement and punishment can be positive or negative.

Positive Reinforcement	Positive Punishment

The individual receives something desired (e.g., an item, praise, access to an activity) when they demonstrates appropriate/desired behavior.	The individual receives something unpleasant when they demonstrate inappropriate/undesired behavior.
Negative Reinforcement Something unpleasant is removed from the individual with the individual demonstrates appropriate/desired behavior.	**Negative Punishment** Something pleasant is removed from the individual with the individual demonstrates inappropriate/undesired behavior.

In feeding therapy, behavior interventions are used to increase appropriate behavior such as accepting bites, swallowing, and trying new foods as well as decrease inappropriate feeding refusal behavior such turning head, clamping lips shut, pushing food away, throwing food, crying, leaving the table, etc. The treatment of behavior problems begins with identifying why a person is engaging in a behavior, and this reason is referred to as the 'function'. Completion of a Functional Analysis or Functional Assessment commonly occurs as part of behavioral treatment because the most effective behavioral strategies will be those that address the function of behavior. There are four functions of behavior:

Function	Description	Examples
Attention	To gain attention, interaction, reaction from others; can include talking, touching, and looking at the individual	-Child keeps asking "are we there yet?" and parents keeps saying "not yet" -Child looks at parent before or while running away -Child looks for reaction from parent while spitting out food
Tangible	To gain access to a desired items and/or activities	-Parent says "no" to a request for a cookie and child throws self to floor -Teacher says it is not time for recess and child hits teacher
Escape	To avoid doing something that parents, teachers, caregivers, etc. ask the individual to do	-Parent says "clean up your toys" and child ignores (keeps playing) -Child hits OT when asked to cut out a shape -Child throws plate to ground when given a food s/he does not like
Automatic/Sensory	The behavior (movement of the body or items) feels good to the individual	-Chewing gum -Eating favorite foods -Rocking in a rocking chair -Watching items spin

Functional Analysis is a comprehensive, experimental procedure that requires extensive training. Functional Assessment is less intensive and often the easiest method to employ, although there is a risk for misinformation. When identifying the function, it is important to evaluate both antecedents

(conditions, items, events that make a behavior more likely to occur) and consequences (reinforcers and punishers that occur *during or after* a behavior). An ABC Analysis may be helpful:

Date & Time	Antecedent What happened before the behavior? What triggered the behavior?	Behavior What behavior(s) was demonstrated? Include both positive and negative behaviors.	Consequence How did others react (caregivers, peers)? What happened right after the behavior? Was the behavior disciplined, praised? Did the individual receive anything as a result of the behavior?

Antecedents can also become strategies that are used to increase the likelihood of a desired behavior or decrease the likelihood of an undesired behavior, and consequences can be altered to change behavior. Behavioral feeding problems very often have the functions of escape and attention. With regard to antecedents, strategies can include

- **Appetite manipulation/hunger induction:** setting up a routine feeding schedule (i.e., encourages hunger between meals, especially if children are used to 'grazing' throughout the day and/or filling up on liquid calories like milk)
- **Establishing consistent mealtime routines:** having a consistent location for meals so a child learns to associate the mealtime expectations with that scenery
- **Gradually increase demands:** in the initial phases of therapy, using foods that the child accepts at least some of the time rather than beginning with foods the child has never before accepted
- **Visual supports**: make expectations clear to the individual through visual means such as by placing a small amount of food on the plate rather than a plate full of food
- **Texture fading**; gradually increasing the texture of the presented food

Consequence strategies can include

- **Positive Reinforcement:** Offer positive reinforcement for accepted bites and appropriate sitting behavior (praise, access to short clip of a favorite movie, time to play with a favorite toy, small bite of a favorite food).
- **Negative Reinforcement:** Offer negative reinforcement for completion of the meal/expected portion such as by allowing individual to leave the table once completed
- **First-Then Communication:** Communicate clear expectations such as First bite, Then 'all done'/get toy/etc.
- **Escape extinction** is an essential component of behavioral feeding treatment and involves strategies such as showing no reaction/emotion if the individual engages in inappropriate behavior, blocking the individual from leaving the table, and holding a plate down so that the individual cannot throw it. This is done alongside ample reinforcement for any appropriate behavior. Please note that food is very rarely if ever placed into the child's mouth (i.e., 'force feeding').

REFERENCES

Blackman JA, Nelson CL. Rapid introduction of oral feedings to tube-fed patients. *J Dev Behav Pediatr*. 1987;8(2):63-67.

Cornwell SL, Kelly K, Austin L. Pediatric Feeding Disorders: Effectiveness of Multidisciplinary Inpatient Treatment of Gastrostomy-Tube Dependent Children. *Children's Health Care*. 2010;39(3):214-231.

Piazza CC, Fisher WW, Brown KA, et al. Functional analysis of inappropriate mealtime behaviors. *J Appl Behav Anal*. 2003;36(2):187-204.

Reed, CK, Piazza, CC, Patel, MR, et al. On the relative contributions of noncontingent reinforcement and escape extinction in the treatment of food refusal. *J Appl Behav Anal.* 2004;37(1):27-42.

Schauster H, Dwyer J. Transition from tube feedings to feedings by mouth in children: preventing eating dysfunction. *J Am Diet Assoc*. 1996;96(3):277-281.

Silverman AH, Kirby M, Clifford LM, et al. Nutritional and psychosocial outcomes of gastrostomy tube-dependent children completing an intensive inpatient behavioral treatment program. *J Pediatr Gastroenterol Nutr*. 2013;57(5):668-672.

Williams KE, Riegel K, Gibbons B, Field DG. Intensive Behavioral Treatment for Severe Feeding Problems: A Cost-effective Alternative to Tube Feeding? *Journal of Developmental and Physical Disabilities*. 2007;19(3):227-235.