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SEQUENTIAL TREATMENT OF A FEEDING PROBLEM USING A PACIFIER AND FLIPPED SPOON

KRISTI D. RIVAS, CATHLEEN C. PIAZZA, HEATHER J. KADEY, VALERIE M. VOLKERT, AND VICTORIA STEWART

UNIVERSITY OF NEBRASKA MEDICAL CENTER'S MUNROE-MEYER INSTITUTE

Parents may be reluctant to treat the feeding disorder of a chronically ill child who exhibits distressed behavior during feeding. In this study, we identified a child with chronic medical problems and a feeding disorder who cried during feedings. We introduced treatment components sequentially to address parental concerns about crying. First, we used a pacifier to reduce crying, and then we used a flipped spoon to increase mouth clean. The results showed that a sequential approach to treatment can be effective for children with complex medical and behavioral problems.

Key words: feeding disorders, flipped spoon, gastroschisis, pacifier, pediatric feeding disorders

Children who are chronically hospitalized often show distress (e.g., crying) during routine caregiving activities (Derrickson, Neef, & Cataldo, 1983). These distress behaviors may generalize to a variety of routine caregiving activities, particularly feeding. In fact, a number of studies have shown that feeding difficulties (e.g., refusal, crying) are more common in children with chronic medical problems (e.g., Field, Garland, & Williams, 2003). Caregivers may be reluctant to feed a child who is distressed.

One way to approach the dilemma of parental reluctance to feed a child who is distressed is to treat behaviors sequentially (i.e., reduce levels of crying first and then evaluate the effects of treatment on other behaviors). We used this sequential treatment approach with a child who had a history of chronic medical problems, exhibited high levels of crying during feedings (at which time his mother was reluctant to feed him), and packed accepted bites of food.

Address correspondence to Cathleen C. Piazza, Pediatric Feeding Disorders Program, Munroe-Meyer Institute, 985450 Nebraska Medical Center, Omaha, Nebraska 68198 (e-mail: cpiazza@unmc.edu).

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METHOD

Participant, Setting, and Materials

Jason was a 6-month-old boy with short gut secondary to gastroschisis who had been admitted to an intensive outpatient program for 2 to 8 hr per week for 7.5 weeks. He had been referred for food and liquid refusal and gastrostomy (G-) tube and total parenteral nutrition (TPN) dependence. He received G-tube and TPN feedings throughout his admission.

Sessions were conducted in a room with a one-way observation window and sound monitoring. Materials included a rubber-coated Gerber baby spoon, high chair, pacifier, bowls, food trays, gloves, timers, and a scale.

Response Measurement, Interobserver Agreement, and Design

Trained observers collected data on laptop computers, scoring *acceptance of the pacifier* and *acceptance of bites* separately. Observers scored acceptance for each presentation of the pacifier or bite when Jason actively leaned toward the pacifier or spoon, respectively, with an open mouth in the absence of inappropriate behavior (e.g., head turns, bats) and crying, resulting in the feeder inserting the pacifier or spoon into Jason's mouth within 5 s of the presentation.

Observers scored a presentation when the therapist placed the pacifier or spoon 4 cm from Jason's lips (not including placement of the pacifier or spoon following re-presentation). Observers scored *mouth clean* when no food larger than a grain of rice remained in Jason's mouth 30 s after the entire bite entered his mouth (not including the absence of food due to expulsion). The number of acceptances or mouth clean was divided by the total number of presentations (denominator for acceptance) or bites entering the mouth (denominator for mouth clean), and these ratios were converted to percentages. Observers scored the duration of *crying* (at least 3 s of audible vocalizations that were accompanied by tears, frowns, protruded lower lip, or shaking of the body). The duration of crying was divided by session duration, and this ratio was converted to a percentage. The therapist weighed each bowl of food before and after the session and used 2-g paper towels to clean spills. The therapist calculated grams consumed as presession bowl weight minus postsession bowl weight minus (paper towel weight with spill minus [2 g times the number of paper towels]).

Observers scored feeder behavior to measure procedural integrity. They scored the duration of *incorrect escape* during phases including nonremoval of the spoon (NRS). Incorrect escape was defined as the feeder holding the spoon more than 4 cm from Jason's lips at any time (a) after the 30-s timer signaled the onset of a bite presentation until the feeder deposited the bite into his mouth or (b) when any food larger than a grain of rice was outside the lips (after the bite had entered his mouth) until the feeder re-presented the bite. Observers scored the frequency of *incorrect attention* when the feeder provided any vocal statement to or physical contact with Jason within 3 s of inappropriate behavior; this was converted to a percentage after dividing the frequency of incorrect attention by the number of inappropriate behaviors. Mean incorrect escape was 1%; mean incorrect attention was 0%.

Two observers recorded data simultaneously but independently during 58% of sessions. Total interval agreement was calculated for acceptance, mouth clean, and incorrect attention by summing occurrence (both observers scored the occurrence of the behavior) and nonoccurrence (both observers did not score an occurrence of the behavior) agreements; dividing by the sum of occurrence agreements, nonoccurrence agreements, and disagreements (one observer scored the occurrence and the other observer did not score the occurrence of the behavior); and converting this ratio to a percentage. Mean interobserver agreements were 92% (range, 61% to 100%) for acceptance of bites, 96% (range, 78% to 100%) for mouth clean, and 96% for incorrect attention (range, 72% to 100%). Mean agreements were 89% (range, 39% to 100%) for crying and 98% (range, 79% to 100%) for incorrect escape, which was calculated by dividing the smaller duration by the larger duration in each 10-s bin and converting this ratio to a percentage.

We used an ABABCDCDEDE design in which A was baseline, B was baseline plus pacifier, C was NRS, D was NRS plus pacifier, and E was NRS plus pacifier plus flipped spoon.

General Procedure

A trained therapist conducted 20-min meals one to three times per day with at least 1.5 hr between meals and approximately three to four five-bite sessions within meals. We introduced the participant's mother as the feeder at Session 84 because Jason was about to return home. In each session, the feeder presented a quarter of a level spoonful of baby food (carrots, turkey, chicken, green beans) in a random order across sessions, but in the same order within sessions.

The feeder presented bites at Jason's midline accompanied by a verbal prompt to "take a bite" approximately every 30 s. The feeder delivered brief verbal praise following acceptance. The feeder implemented a mouth check 30 s after the bite entered Jason's mouth to determine if he had swallowed. The feeder

delivered praise and the next bite if no food larger than a grain of rice was in Jason's mouth following the first 30-s check (except if the absence of food was due to expulsion). The feeder delivered a verbal prompt (e.g., "swallow your bite") and the next bite if any food larger than a grain of rice remained in the mouth at the 30-s check. If there was food larger than a grain of rice in the mouth after the presentation of the fifth bite, the feeder repeated the prompt to "swallow your bite" every 30 s until no food larger than a grain of rice was in his mouth or 10 min had elapsed from the beginning of session. If Jason had food in his mouth at the end of 10 min, the therapist scooped the food out of his mouth with a spoon.

Baseline. The feeder followed the procedures described above and deposited the bite if Jason opened his mouth in the absence of inappropriate behavior and crying. The feeder held the spoon at midline for 30 s if Jason did not accept the bite, provided no differential consequences for crying or inappropriate mealtime behavior, did not re-present expelled bites, and interacted with Jason (e.g., sang) throughout the session.

Baseline plus pacifier. The procedures were identical to the baseline with the following additions. If Jason accepted the bite, the feeder presented a pacifier to Jason's lips immediately. The feeder presented the pacifier 5 s after the bite presentation if Jason did not accept the bite, and the spoon remained at midline for 30 s while the pacifier was in his mouth. If Jason did not accept the pacifier (which was atypical), it remained at his lips for 30 s from when the feeder presented the bite. The feeder re-presented the pacifier (at Jason's lips or into his mouth) if Jason spit it out and removed it at the end of the 30-s interval. We used a pacifier because he accepted it readily and stopped crying when his mother gave it to him outside the feeding sessions, and because our initial goal was to eliminate crying but not necessarily increase acceptance.

NRS. If Jason did not accept the bite within 5 s, the spoon remained at his lips until the feeder deposited the bite into his mouth. The feeder re-presented expelled bites. The session would have ended after 10 min if the feeder was not able to deposit all of the bites (this never happened).

NRS plus pacifier. The procedures were identical to NRS with the addition that the feeder presented the pacifier as soon as she deposited the bite into Jason's mouth.

NRS plus pacifier plus flipped spoon. The procedures were identical to NRS plus pacifier with the following addition. We focused on increasing mouth clean by presenting and re-presenting bites on a flipped spoon, which consisted of the feeder inserting the upright spoon into Jason's mouth, turning the spoon 180°, dragging the bowl of the spoon along Jason's tongue, and depositing the bolus of food in the middle of Jason's tongue (Volkert, Vaz, Piazza, Frese, & Barnett, in press). We used the flipped spoon because Volkert et al. (in press) showed that this procedure reduced packing (the converse of mouth clean).

RESULTS AND DISCUSSION

As shown in Figure 1 (top), the pacifier was effective in decreasing crying in the two baseline plus pacifier phases (*M*s = 35% and 12%). Although levels of crying were low in baseline plus pacifier, Jason did not accept any bites (Figure 1, middle), and his gram intake was minimal (*M* = 0.36). Therefore, we implemented NRS to increase acceptance of bites. Levels of acceptance increased during NRS (*M* = 95%), but high levels of crying reemerged (*M* = 58%). Reintroduction of the pacifier plus NRS resulted in decreased levels of crying (*M* = 36%) and high levels of acceptance (*M* = 100%), which were replicated in the reversal to NRS (*M*s = 86% and 76% for crying and acceptance, respectively) and NRS plus pacifier (*M*s = 30% and 90% for crying and acceptance, respectively). Grams consumed also

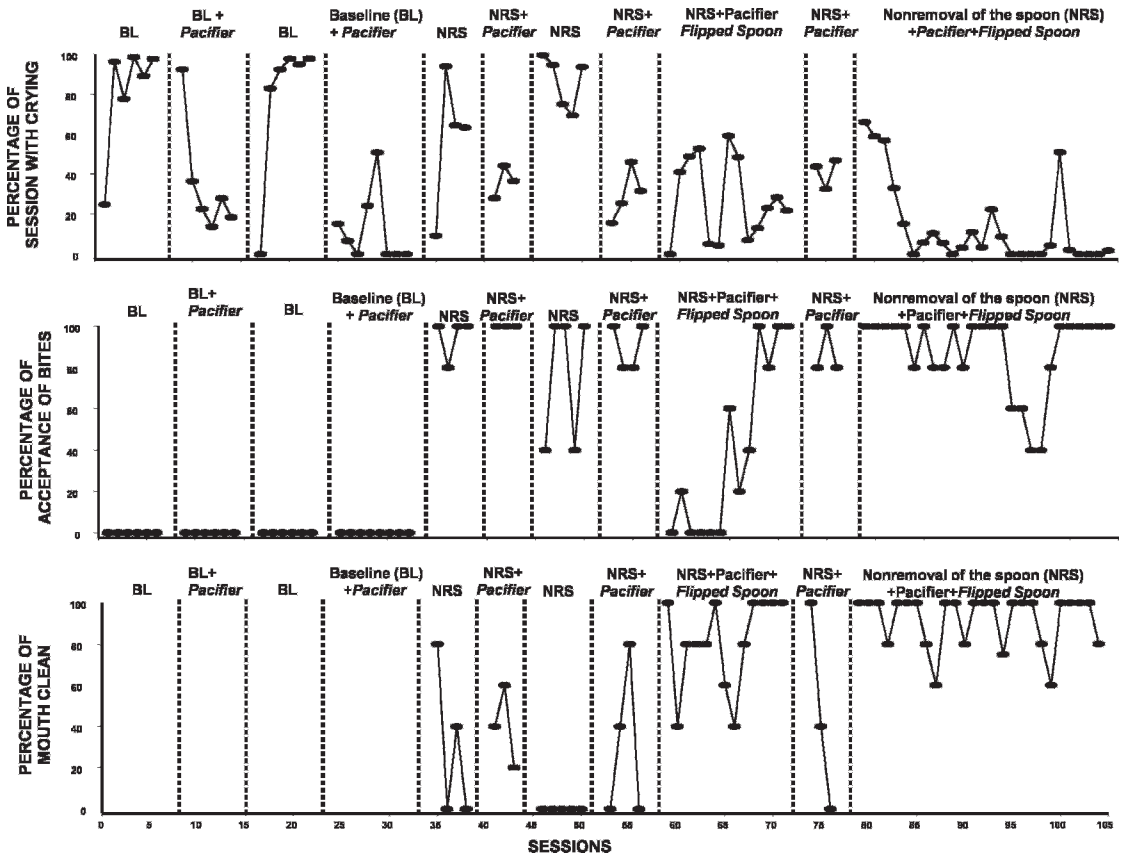

Figure 1. Percentage of crying (top), acceptance of bites (middle), and mouth clean (bottom). NRS = nonremoval of the spoon, BL = baseline.

increased during NRS plus pacifier (M = 1.3). These data show that the pacifier was effective in reducing crying. We continued to use the pacifier for the remainder of the analysis because of its demonstrated effects on crying.

Although acceptance was high during NRS, levels of mouth clean (Figure 1, bottom) were low. The addition of the flipped spoon to NRS plus pacifier resulted in high levels of mouth clean (M = 82%). The effects of the flipped spoon on mouth clean were replicated in a reversal (Ms = 47% and 92% for NRS plus pacifier and NRS plus pacifier plus flipped spoon, respectively). Grams consumed remained stable (M = 1.4). The data from the current study replicate and extend those of Volkert et al. (in press), who used a flipped spoon to decrease the packing of two preschoolers. Our data suggest that the flipped spoon may be just as effective for much younger children.

In the current investigation, we evaluated the separate effects of treatment on multiple dependent variables (Cooper et al., 1995). Feeding disorders provide an excellent subgroup for this type of analysis because of the complexity of behaviors that comprise the disorder. In this case, Jason was chronically ill and had high levels of crying during feeding. Therefore, his mother was reluctant to feed him.

This study is unique in that we used a pacifier to reduce crying, which is not typical in the behavior-analytic literature. However, pac-

ifiers are used commonly with premature infants (Schwartz, 1987) and by parents to calm distressed infants (Kimble, 1992). Experimental research has shown that pacifiers are effective for (a) reducing crying when children are in pain (e.g., Treloar, 1994), (b) decreasing the length of hospital stays for preterm infants (Schwartz, 1987), (c) decreasing time in fussy states, and (d) decreasing defensive behavior during tube feedings (DiPietro, Cusson, Caughy, & Fox, 1994). In Jason's case, we delivered the pacifier after presentation of the bite rather than after crying (which is typical of pacifier use) to avoid the pacifier functioning as reinforcement. The data from the current investigation suggested that, in fact, the pacifier was consistently associated with reduced levels of crying. Jason readily accepted the pacifier throughout the analysis (M = 93%, data not shown) and continued to accept the pacifier outside of feedings.

In conclusion, we used a pacifier, NRS, and a flipped spoon to treat the food refusal of a 6-month-old with a complicated medical history. These data contribute to the literature on pediatric feeding disorders because the pacifier is novel to the behavior-analytic literature but may represent a viable treatment for young children with chronic medical and feeding problems.

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