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Bestler, Courtney, "Pediatric Feeding Disorders and Intervention" (2014). *Research Papers*. Paper 471.
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PEDIATRIC FEEDING DISORDERS AND INTERVENTION

by

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M.S., Southern Illinois University-Carbondale, 2014

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
Master of Science

Rehabilitation Institution

in the Graduate School

Southern Illinois University Carbondale

May 2014

RESEARCH PAPER APPROVAL

PEDIATRIC FEEDING DISORDERS AND INTERVENTION

By

Courtney Bestler

A Research Paper Submitted in Partial

Fulfillment of the Requirements

for the Degree of

Master of Science

in the field of Communication Disorders and Sciences

Approved by:

Maria Claudia Franca, Ph.D., CCC-SLP, Chair

Graduate School

Southern Illinois University Carbondale

2/10/2014

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Introduction

Feeding issues are common, occurring in about 45% of children who develop normally (Linscheid, 2006). These issues occur at even higher rates in children with disabilities, including intellectual and physical disabilities, and autism. Successful feeding depends on a number of factors including anatomical structure, health and development. Contributing medical conditions include prematurity, gastro esophageal reflux disease (GERD) and other structural abnormalities (Linscheid, 2006). In addition, children with dysphagia who have no anatomical or physiological impediment to swallowing, are either unable to swallow or have difficulty with swallowing due to behavioral problems (Logemann, 2000). Treatment of pediatric dysphagia presents many challenges and it is highly individualistic to each child. The interventionist needs to be prepared to utilize a variety of intervention approaches to successfully treat feeding impairments. Strategies may include oral-motor intervention, postural changes, feeding adjustments in pacing and schedule, diet modification, and behavioral intervention. Pediatric feeding intervention varies based on the etiology of the feeding impairment. Although interventions are highly individualized, all should promote feeding that is safe, functional, and pleasurable.

Management Approach

The treatment of pediatric dysphagia values a team approach to management. Decisions are best made through a team approach that involves the caregivers, medical, and educational professionals. Together these professionals work towards maximizing each child's nutritional status through safe and efficient feeding (Arvedson, 1998). Some of the decisions that the pediatric feeding team will need to make may involve nutrition recommendations, medical and surgical decisions, position guidelines, oral-motor/swallow practice, and behavioral intervention. The speech-language pathologist (SLP) has a critical role in many of these decisions regarding

evaluation and in the development of realistic short- and long-term goals (Burklow, Kirby, Mason, Miller, Rudolph, & Santoro, 2001).

Before feeding intervention for infants and young children can begin, there are certain prerequisites that must be established. These ensure the safety and increase success of a feeding session. The prerequisites for the infant to begin feeding intervention include cardiopulmonary stability, an alert and calm state, demonstration of appetite or interest in eating, and proper positioning for a functional and safe swallow (New York State Department of Public Health, 2006). The goal of oral feeding may not be attainable for all children so it is important that the SLP, with assistance from other professionals, is able to determine when oral feeding is too great a risk for the child and alternative methods of nutrition are necessary.

Oral Motor Intervention and Nonnutritive Sucking

Oral motor intervention (OMI) is often considered a controversial approach to treatment of dysphagia. However, they are used frequently in neonatal intensive care units (NICU) with preterm infants. The types of OMIs typically used are nonnutritive sucking (NNS) and/or oral stimulation (Arvedson, Clark, Frymark, Lazarus, & Schooling, 2010). NNS intervention is used to facilitate the transition from tube feeding to breast or bottle feeding. Nonnutritive sucking can be implemented with the use of a pacifier or gloved finger inserted gently into the infant's oral cavity. Barlow, Gu, Poore, Wang, and Zimmerman (2008), investigated the use of NTrainer treatment for increasing non-nutritive sucking output in infants necessary for possible oral feeding. The NTrainer is a biomedical device that provides patterned stimulation of the oral structures through a silicone pacifier that mimics the timing of the infants suck. They found that this therapy effectively accelerates non-nutritive suck development and oral feeding success in preterm infants (Barlow et al., 2008).

Arvedson et al. (2010), recommended NNS because of the benefits to preterm infants' development. NNS promotes positive sucking behavior that is vital to nutritional intake. For infants receiving enteral (tube) feedings, NNS can improve digestion of the substances. Perhaps one of the most significant benefits for infants and their families is the potential for reduced length of time in the hospital (Arvedson et al., 2010). Outcomes also include maturing suck pattern, promoting oxygenation, weight gain, soothing invasive procedures, and regulating behavioral state (Arvedson et al., 2010). If oral motor intervention is identified as a treatment option it is important treatment be directed toward the phases that are primarily effected, particularly the oral preparatory and oral phases (New York State Department of Public Health, 2006).

Oral/Perioral Stimulation

Oral and perioral stimulation programs are aimed at accelerating the process to attain total oral feeding. Preterm infants are at high risk for oral feeding difficulties and early sensorimotor interventions may improve their feeding skills. These programs consist of stroking or application of light pressure to the lips, cheeks, tongue, or other oral structures (Arvedson et al., 2010). Fucile, Gisel, Lau and McFarland (2012), investigated the effects of oral, non-oral (tactile/kinesthetic), and combined oral/tactile/kinesthetic sensorimotor intervention on preterm infants. They found that all three interventions resulted in improved swallow-respiration coordination. While the nonoral methods presented improvements in infants swallow pattern, the oral intervention was found to be most effective (Fucile et al., 2012). Arvedson et al. (2010) explained that oral/perioral stimulation can decrease hypersensitivity in oral structures, improve the range of motion and strength of these structures, as well as activate the reflex behaviors necessary for successful nutritive sucking.

The use of OMI intervention programs are considered controversial due to mixed outcome results. In a review of various evidence based practices using OMI, Arvedson et al. (2010), found that nonnutritive sucking had no effect on a variety of functional oral feeding and swallowing outcomes including volume intake, change in weight, and number of tube feedings. However, NNS was associated with significant positive changes on swallowing measures and reducing the number of days required to reach total oral feeding in preterm infants.

Findings for or against the use of oral and perioral stimulation were mixed and a limited number of studies were available to be examined. Thus, there is insufficient evidence available to support or refute the use of this intervention. However, stimulation combined with NNS yielded significant positive effects on reducing the time to transition to oral feeding (Arvedson et al, 2010). Also, the combination of both types of OMI was associated with positive effects on rate of breast milk/formula transfer and overall intake. These findings can be used as a guide for clinicians regarding the management of oral feeding problems. Clinician's should implement these interventions with caution and be well aware of the various intrinsic and extrinsic factors that play a role in determining the preterm infant's readiness for nipple feeding.

Compensatory Strategies

Postural Changes

The purpose of postural changes in feeding is to change the direction of food flow and the anatomical dimensions of the pharynx (Logemann, 2000). Posture changes are compensatory strategies and include postures of chin down, chin up, head rotation, head tilt, and lying down. The chin down posture improves tongue base to pharyngeal wall contact, narrows the airway entrance, and puts the epiglottis closer to the posterior pharyngeal wall. All of these mechanisms then interact to improve airway protection. This posture is ideal for children with instrumental

evaluations that showed a delay in triggering the pharyngeal swallow, reduced laryngeal closure, or reduced tongue base to pharyngeal wall contact (Logemann, 2000).

The chin up technique facilitates transit of the bolus from anterior to posterior of the oral cavity by utilizing the effects of gravity (Logemann, 2000). This is appropriate for children with severe oral tongue problems. If airway protection is an additional concern, the therapist can teach the child to use the breath-hold technique with the chin lift. In this procedure, the child is asked to hold their breath as they swallow. This helps protect the airway voluntarily (Logemann, 2000).

A head rotation position to the damaged side of the pharynx or larynx can be implemented to direct the food to the stronger side and improve laryngeal closure (Logemann, 2000). This posture is appropriate for unilateral pharyngeal wall damage or laryngeal damage. A head tilt can be used if the oral and pharyngeal abnormalities are on the same side of the child's body. Tilting the head helps direct food to the stronger side by gravity. A final posture change that may be beneficial for the child is lying them down on their stronger side or back. This acts similarly to the effects of the head tilt; by changing the positioning, the effects of gravity can change the course of any pharyngeal residue. Lying the child down will eliminate the potential for aspiration caused by reduced pharyngeal contraction or laryngeal elevation (Logemann, 2000). However, a child with significant GERD would not be a good candidate for this position because gravity change may increase amount of reflux entering the pharynx.

The benefit of these compensatory strategies is they can be implemented in a variety of environments, including educational settings. Many other intervention strategies may be a challenge for the school-based SLP to implement due to their equipment requirements and overall structure. However, there are an increasing number of children with feeding impairments

due to other disabilities being mainstreamed in schools. Posture changes are an intervention approach that can be used in a school setting without significant challenges.

Bottle Feeding

Oral feeding of premature infant's can be challenging because the infants do not feed as readily as full-term infants. However, Lau and Schanler (2000) explained that the discharge of infants from the NICU is correlated with their ability to oral feed safely and successfully. This requires the proper coordination of suck, swallow, and respiration. Therapists working with infants who have difficulty coordinating the suck-swallow-breathe will use an intervention known as external pacing. They pace the infant's feeding by removing the bottle at regular intervals to allow the infant time to catch-up their breathing (Lau & Schanler, 2000).

Another method that therapists have implemented to increase the success and safety of oral feeding has been to regulate the rate milk flows from a bottle. It is reported that a fast flow can increase risk of aspiration and choking, particularly in premature infants. To reduce flow a harder nipple can be used or the size of the nipple hole can be changed. The decrease in flow may enhance feeding performance because it allows the infant more time to form the bolus and decreases swallowing frequency and volume, improving coordination of the swallow-breathe (Lau & Schanler, 2000).

Pacing Systems

Lau and Schanler (2000) also recommend the use of a self-paced system to enhance the feeding performance of premature infants. The self-paced system uses a specially designed bottle that delivers milk to the nipple chamber from the bottle at the pace of the infants sucking. With the self-paced system, milk only flows when the infant is sucking, as opposed to the unrestricted flow provided by standard bottles (Lau & Schanler, 2000). These strategies are appropriate to

implement with infants who are having swallowing or feeding problems. With older children who are no longer bottle feeding, other interventions need to be introduced.

Behavior Management

Behavior management is a well supported intervention strategy for pediatric feeding problems. There are many factors that contribute to decision making during behavior management therapy including child's medical condition, medical monitoring requirements, and the need to adjust treatment procedures as intervention progresses. Behavior management treatment programs involve two major components: appetite manipulation and contingency management (Linscheid, 2006).

Appetite Manipulation

The basis of appetite manipulation according to Linscheid (2006) is increasing motivation to eat by decreasing caloric intake between meals to ensure the child will be hungry at meal time. For an inpatient admission of a child with a feeding tube, appetite manipulation is accomplished by stopping any caloric formula feedings during the first couple of days, while supplying water. Depending on the child's weight loss, it can be determined on a day-to-day basis if calories need to be delivered via the feeding tube to ensure the child does not lose too much weight. If tube feeding is determined to be necessary for nutritional benefits of the child, they are only provided at night. This is an effort to avoid the child making the association between tube feeding and hunger cessation (Linscheid, 2006). This method has a success rate of 87.9% for elimination of feeding tubes and requires an overall length of stay of 8.77 days. For patients treated at home as outpatients, Linscheid emphasizes the importance of daily weight checks, hydration status assessments, and to teach parents medical signs of low blood sugar or dehydration (Linscheid, 2006).

Contingency Management

Contingency programs are another form of behavior management intervention for feeding disorders. The most basic model involves the manipulation of behaviors and consequences (Linscheid, 2006). When a child delivers a desired behavior during feeding, positive reinforcers are immediately provided. These may include social praise and interaction, access to preferred toys or videos, and access to preferred foods if the child is already taking food by mouth. Behaviors that interfere with feeding such as pushing away the spoon, crying, or turning the head away, can be treated with mild punishment. The form of punishment recommended by Linscheid (2006) is a brief time out. This is a time period when the child is receiving no nutrition and no social interaction (Linscheid, 2006).

Negative reinforcement is also utilized in the contingency program. One example is known as contingency contacting (Linscheid, 2006). This involves the therapist holding a loaded spoon at the child's lip until the mouth is opened and the food is accepted. Holding the spoon at the child's lip and not allowing any other activity to take place creates an aversive situation that the child will want to escape. The child learns the only way to do so is by accepting the food. Praise is then paired with the food acceptance (Linscheid, 2006).

Parent Training

Behavior management approaches can be implemented by trained therapists or by parents acting as therapists (Linscheid, 2006). The therapist then acquires the role of treatment planner and trainer, and must observe the parent and child feeding interactions consistently. Through modeling and demonstration of treatment techniques, the therapist trains the parent to lead intervention. The therapist monitors parents through the use of parent-collected data on child's

feedings, video recordings of feeding sessions, or direct observation. The therapist provides ongoing feedback to the parent so the most successful intervention is provided (Linscheid, 2006).

The environment therapy is conducted in can also vary. Some parents may choose to perform intervention tasks in their own home. This is beneficial to the child because of the naturalistic environment and the increased likelihood of their new feeding skills to generalize to their everyday environment. Feeding intervention can also be conducted using the inpatient model created by Linscheid (2006). In this center-based model, meals are restricted to a maximum of 25 minutes. The goal of time restriction is to minimize distress on the child. Also, it creates a more realistic meal environment, since children feeding typically usually eat within this time period. Treatment meals are done three times per day, seven days a week. Also, no between-meal snacks are offered early in the treatment process to ensure the child will be hungry when meal time arrives (Linscheid, 2006).

Inpatient Implementation

In the inpatient model, parental involvement is restricted initially. The parents are not permitted in the treatment room early in therapy because their absence in the beginning allows identification of behaviors that are counterproductive to treatment and caused by the act of feeding (Linscheid, 2006). Also, intervention can be distressing early on for the child, and it is difficult for parents to limit their responses to the distress (Linscheid, 2006). After the therapist has established some success with treatment techniques, the parent is allowed in the treatment room. While the parent observes, the therapist demonstrates and describes the procedures they are using. The final step to the inpatient treatment model is for the parent to feed the child with the therapist nearby (Linscheid, 2006). When the following criteria are met, the child is ready to be discharged. First, the child is taking sufficient calories to maintain weight and nutrition.

Second, treatment goals regarding variety of food intake are met. The final requirement is that the parents feel comfortable with the techniques and are capable of implementing them at home (Linscheid, 2006).

Peer Mediated Training

Another behavior management approach involves the use of peer-mediated learning (Asnes, Dorow, Greer, McCorkle, & Williams, 1991). This concept has been utilized in a variety of ways in education systems successfully. Researchers found that the peer-modeling concept could be implemented successfully in young children with feeding impairments. Asnes et al. (1991) utilized a peer model treatment that consisted of a target child and a peer being presented the same meals at the same time. They each received praise when they consumed bites of the food. The target child successfully began consuming meals and it was found that the peer-mediated procedure was a key ingredient for the increase in food consumption (Asnes et al., 1991). Therapists can utilize this knowledge by incorporating peers into treatment more often to encourage peer-mediated learning. Children may be more likely to experiment with new foods if they see their peers doing the same.

Intervention and Autism Spectrum Disorders

Children with autism spectrum disorders (ASD) often demonstrate feeding impairments for a variety of reasons and they are typically treated with behavior based programs. According to Amaral, Twatchman-Reilly and Zebrowski (2008), there are several key features of a behavior based feeding intervention program for children with ASD. The first feature that is important is predictability. Children with ASD are not typically welcoming of new situations in which expectations are unpredictable. Preparing the child for what to expect during the process of feeding intervention will help reduce their anxiety and increase cooperation. Discussing with the

child what will happen and what they will do, often through the use of social stories, will help the child in therapy (Amaral et al., 2008).

Another feature of feeding intervention that is specific to the child with ASD is the importance of addressing the child's repetitive behaviors. Children with ASD are driven by routine. With feeding, these routines are often maladaptive eating practices (Amaral et al., 2008). The focus of therapy should not be on removing routines, but instead replacing them with more productive feeding routines. These beneficial routines include selecting foods that are nutritionally balanced and only allowing the child to eat the same meal every other day to promote variety. Also, routines for safe eating behaviors should be introduced to the child for them to follow (Amaral et al., 2008).

In some cases these behavioral methods are often overemphasized for children with autism spectrum disorders (ASD) because they are frequently seen as difficult eaters (Amaral et al., 2008). However, a physiological cause may be the basis of their feeding problems. One common physiological cause of feeding impairment in children with ASD is sensory processing (Amaral et al., 2008). Intervention techniques to address difficulties with sensory processing include strategies to decrease self-stimulating behaviors, improve attention, and regulation of in-seat behavior that may be interfering with the child's ability to participate in effective meal time. Also, oral desensitization techniques may be implemented such as oral and facial massage techniques and oral exploration of different tastes, temperatures, and textures (Amaral et al., 2008).

Diet Modification

When children are unable to successfully and safely feed, even with implementation of the above methods, other strategies may be introduced. One of these methods is modification of

the child's diet (Hollin, 2011). The purpose of diet modification is to assist the child in managing the bolus for a safer, more successful swallow. Diet modification includes managing bolus size, flavor, and texture. Modifications vary depending on the needs of the child (Hollin, 2011). Smaller bolus sizes are more commonly recommended, however a larger bolus may be found beneficial because they increase sensory awareness in the oral cavity. Also, a larger bolus may assist in bolus formation and reduce pharyngeal transit time (Hollin, 2011). The texture of food can also be varied to promote successful swallowing. Various textures should be explored to determine the one that is most tolerated and determined most effective for the child. Thickened fluids are typically recommended in swallowing impairments because they assist in reducing the risk of aspiration (Hollin, 2011).

The use of thickened liquids as a treatment method for children requires continued investigation (Gosa, Coleman, & Schooling, 2011). Gosa et al. (2011) found no evidence that advised against the use of thickened liquids, however further research is needed to determine all the adverse and beneficial effects of this method.

Non-Oral Feeding

In some instances intervention options may be unsuccessful and the safety and health of the child continues to be at risk due to dysphagia. In these cases, it is recommended that alternative means of nutrition and hydration be utilized. Alternative methods include temporary or longer-term feeding tubes (Kikano and Prasse, 2009). This method, known as gastrostomy feeding, is intended for temporary use only. Following placement of a gastrostomy tube, treatment should focus on the elimination of tube feeding and increased acceptance of oral feeding (Bernard-Bonnin, 2006).

There are a variety of reasons that could contribute to the decision to begin tube feeding an infant. Infants born preterm often require tube feeding for a period of time. Before preterm infants can be discharged from the hospital, they need to demonstrate competent oral feeding skills. Successful oral feeding is accomplished when the infant is able to take all of a prescribed volume of liquid by mouth within a specified time period and maintain a pattern of weight gain (Lau, Schanler & Simpson, 2002). The earlier oral feeding can be attained successfully, the earlier hospital discharge can be recommended (Lau et al., 2002).

Lau et al. (2002) conducted a study to determine whether the transition from tube to all oral feeding can be accelerated by the introducing oral feeding earlier to preterm infants. In the study, oral feeding was initiated in preterm infants 48 hours after receiving full tube feeding, while the other infants were introduced to oral feeding when their attending physicians determined it was appropriate. It was found that the infants introduced to oral feeding significantly earlier than the control group, attained oral feeding significantly earlier. Thus, early introduction of oral feeding is recommended in preterm infants to accelerate the transition time from tube to oral feeding (Lau et al., 2002).

Pre-feeding oral stimulation programs were also found to accelerate the attainment of independent oral feeding. Fucile, Gisel, and Lau (2002), conducted a study to determine the effects on feeding of an oral stimulation program. The program consisted of stimulation of the oral structures for 15 minutes, once per day, for 10 days. They found that independent oral feedings were attained significantly earlier in the preterm infants who received the oral stimulation program compared to those preterm infants who did not. The early transition from tube to oral feeding and implementation of an oral stimulation program may lead to quicker

success of oral feeding, a shortened hospital stay, and enhanced overall intake of milk (Fucile et al., 2002).

Challenges to Intervention

It can be a challenge to implement treatment protocols for children with feeding problems for a number of reasons. First, feeding problems are not homogenous. There are a wide variety of etiologies, from medical to behavioral, so treatment strategies will vary based on the underlying cause of the dysphagia (Arvedson et al., 1998). Also, treatment goals may change as treatment progresses and new behaviors are encountered. These challenges are why it is important that the SLP be knowledgeable on a number of intervention approaches, as well as comfortable implementing each one for the benefit of the child (Arvedson et al., 1998).

Another challenge can be the variation in environments where therapy is to be implemented (Arvedson & Lefton-Greif, 2008). Fortunately, advancing medicine has led to improved survival rates of preterm infants with very low birth weight, infants with major cardio respiratory conditions, and children with neurological insults (Arvedson & Lefton-Greif, 2008). The survival of these children has resulted in more children with medically complex conditions who have swallowing and feeding problems in schools. Their feeding difficulties can vary from behavior-based feeding problems to delayed development of oral skills (Arvedson & Lefton-Greif, 2008).

Dysphagia management of children in the schools requires the school-based dysphagia teams to work with caregivers and health care professionals to best address the needs of the child (Arvedson & Lefton-Greif, 2008). One of the challenges of treating dysphagia in the school is that the school-based teams do not have the benefit of “onsite” access to immediate medical care. Determining whether a child is safe to feed or how to advance feeding programs requires

coordination with hospital based teams. A team approach is critical so that the child's needs are fully considered within the education environment (Arvedson & Lefton-Greif, 2008). Despite some of the challenges of dysphagia treatment in educational settings, treatment can be successfully implemented. It would be expected that continuing a child's treatment in various environments is best practice.

Future Investigations

The relationship of ASD and feeding disorders should be further investigated . For example, the exact incidence of the occurrence of dysphagia in this population is not definitive so further investigation into this would be important, as well as methods used to distinguish a behavioral issue from a physiological basis to feeding impairment in children with ASD. The literature suggests that there is often an overemphasis on the use of behavior management strategies for feeding intervention in these children, when a physiological impairment may be the cause. Determining best practices for identifying the cause of feeding impairment in each child with ASD would likely improve treatment outcomes.

Furthermore, it has been indicated that effectiveness of oral motor interventions as treatment of dysphagia in children should be investigated. A concise documentation of the effectiveness or ineffectiveness of these methods would help clarifying and improving intervention approaches.

Identifying the best intervention strategies for dysphagia treatment in schools would also be a beneficial investigation for clinicians. Schools can be very culturally diverse and have limited resources available. These factors, along with the skill level of the clinician regarding dysphagia treatment would contribute to the effectiveness of treatment. An investigation into the adequacy of school based clinicians in treating dysphagia in the school setting, the resources

available to them, and the additional resources that are needed would be a useful report for fellow clinicians.

A prospective investigation into the feeding abilities of children who received intervention for feeding impairments as infants would also be an interesting study to conduct. Future effects of feeding impairments in individuals after successful treatment should be examined. Health status at an older age, signs of any feeding impairments, even of psychological issues, or effects of the impairment on their growth throughout life is needed.

Finally, the counseling aspect of treatment practices involves gathering opinions from parents of children with feeding impairments on their feelings throughout the course of treatment. These aspects should be clarified. For example, the most challenging aspects faced as parents of a child with dysphagia should be investigated, as well as their biggest concerns with treatment, successes of treatment, and how effectively they believe their clinician addressed their concerns. Counseling is an aspect of speech and language therapy that might be overlooked in research investigations, but can be just as important to success of intervention as treating the physical impairment itself. It is especially important to consider the opinions and feelings of parents of children with dysphagia because their children are often facing multiple medical obstacles, leaving these families especially concerned with the well-being of their child.

Summary

Pediatric dysphagia has a variety of underlying causes and SLPs are expected to identify the best course of treatment for the individual child. There is a number of treatment options that clinicians can implement based on the cause of dysphagia. In some cases, behavior modification may be the best option, and in others compensatory strategies may yield the best results. When these treatment strategies are not successful, modification of the child's diet may be the only

option for successful nutritional intake. It is important for the clinician to fully consider the child's current health status and environment, as well as the cause of dysphagia when making treatment decisions. Also, a team approach, involving consultation with other professionals and literature, should be utilized when deciding the best course of evidence-based treatment for pediatric dysphagia.

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