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Strategies to Promote Oral Motor Skills and Progression of Foods for Infants and Young Children with Feeding Concerns

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STRATEGIES TO PROMOTE ORAL MOTOR SKILLS AND PROGRESSION OF FOODS FOR INFANTS AND YOUNG CHILDREN WITH FEEDING CONCERNS

by

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Submitted to the Occupational Therapy Department
of the
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In partial fulfillment of the requirements
for the degree of
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This Scholarly Project, submitted by Heather Davis and Anne Winter in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

[Signature]
Faculty Advisor

4-28-11
Date
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Title                     Strategies to promote oral motor skills and progression of foods for infants and young children with feeding concerns

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Signature: Heather Davis  Date: 4-22-11

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The authors wish to thank our advisor, Dr. Gail Bass, for her guidance and support throughout the development of this scholarly project. We would also like to express gratitude to the Occupational Therapy faculty members at the University of North Dakota for expanding our knowledge base within the field of Occupational Therapy. Finally we would like to thank our family for their patience and encouragement throughout this academic endeavor. This project would not have been possible without their cooperation, understanding, and support.

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Eating is a primary occupation for individuals from birth through adulthood. However, some infants and young children experience difficulty and frustration as they begin to eat and transition to foods with texture. Field, Garland, and Williams (2003) determined that up to 80% of children with developmental disabilities experienced problems with feeding. There is a need for providing education and support for the families of these children (White-Traut & Norr, 2009). Pilkington (2006) conveyed that supporting and building the parent’s capacity for caring for their child resulted in enhanced outcomes for the infant or child. Current resources may not be parent-friendly or may not provide appropriate, detailed strategies that apply to a child with feeding difficulties. In order to address this issue, the goal of this scholarly project was to create a manual that occupational therapists could use to educate and support parents and caregivers.

The primary methodology used to create this product included an extensive review of the literature, including research articles, textbooks, and resources currently available to families and caregivers. The Ecological Model of Occupation primarily guided the development of the resource manual based on the relationship between person, context, and the task, and the impact that these variables have on performance.
This resource manual contains research-based educational materials that offer useful strategies that occupational therapists can use when providing interventions to promote advancement of feeding skills and assist with the progression of foods for infants and toddlers with feeding difficulties. Areas of focus include the role of the occupational therapist and the role of the parent in teaching their child to eat. Typical feeding skill development is outlined to assist parents in understanding sequential steps to feeding development. Environmental factors and positioning strategies are addressed for infants and toddlers. A variety of treatment interventions and recommendations to assist in improving feeding for infants and young children are also provided.
CHAPTER I
INTRODUCTION

Eating is a primary occupation for individuals from birth through adulthood. Some infants and toddlers, however, experience difficulty and frustration as they begin to eat and transition to foods with texture. This difficulty may be due to a variety of medical conditions, including premature birth and developmental delays.

Statement of the Problem

Parents often seek guidance for appropriate food choices and techniques to facilitate their child’s progression to eating table foods. According to the literature reviewed in Chapter II of this document, there is a need for providing education and support for the families of these children (White-Traut & Norr, 2009). In general, baby books that are available to parents contain information on typical development. However, these resources may not be parent-friendly or may not provide appropriate, detailed strategies that apply to a child with feeding difficulties. In order to address this issue, the goal of this scholarly project was to develop a manual that occupational therapists could use to educate and support parents and caregivers. The manual, *Feeding Strategies for Infants and Young Children*, will be beneficial for a wide variety of children and diagnoses; it was designed to be
individualized based on the child and family needs, offering flexibility for the family. Included within the manual are handouts that offer useful strategies to promote advancement of feeding skills and assist with the progression of foods for infants and toddlers with feeding difficulties. These strategies can be easily interpreted by parents and caregivers with a variety of educational experiences and background knowledge. The handouts were developed to be easy for parents and caregivers to reference while providing research-based strategies that can be implemented at home within a daily routine.

The targeted population of this scholarly project includes occupational therapists and the families and children that are receiving Early ACCESS services. These services are provided to families with children from birth to age three that have a known condition or demonstrate a delay. Based on the information provided by the parent or caregiver regarding the occupational performance area of feeding, a service coordinator may refer the child and family to the occupational therapist. Occupational therapists provide support and education to families with children who have feeding difficulties, or struggle with advancing along the food continuum. Children and families may receive services in the home or daycare setting. This is supported by Pilkington (2006), who noted that education should be provided in the natural environment for the child.

Factors that may impact the implementation and influence the application of this program might include the attitudes and cultures of the parents. Some parents
do not demonstrate an interest in the feeding techniques offered. Implementing these techniques requires time from parents to actively participate in the feedings of their child, and some parents find it difficult to make this time available. If the parent doesn’t see value to the actions suggested by the Early ACCESS provider, then it often will not be implemented after the provider/therapist is gone.

Environmental barriers may also significantly impact the proposed project. Frequently, families do not have established routines or have been unknowingly reinforcing negative feeding behaviors. Families may have a lack of resources to provide a variety of healthful food choices, thereby, limiting the child’s food experiences and repertoire. Typically parents have a vested interest in improving their child’s skills. However, parents may be unwilling or unprepared for the consistency and effort that is required to address the feeding skill deficits or difficult behaviors that their child is demonstrating.

Theoretical Model

The Ecological Model of Occupation guided the development of this scholarly project, in that, it is based on the relationships among person, task, and context, and the impact that these variables have on performance. Within this model, the person is considered an individual that has unique abilities and skills based on experiences, values and interests. The task is defined as an objective set of behaviors that are performed, or carried out, to accomplish a goal. These tasks that individuals participate in can form a person’s role, or occupation. Context refers to the
interrelated conditions that surround a person. Temporal and environmental contexts are further defined within this model. Temporal contexts include chronological age, developmental stage (phase of maturation), life cycle (place in important life phases), and health status. Environmental contexts include physical, social, and cultural dimensions. Context variables include aspects that support or inhibit performance. *Performance* is when the person engages in tasks within a context (Kramer, Hinojosa, & Royeen, 2003).

There are five intervention strategies that address the person/context/task relationship within the Ecological Model of Occupation. They include: establish/restore, alter, adapt/modify, prevent, and create (Kramer, Hinojosa, & Royeen, 2003). Occupational therapists may address one or more interventions within this framework at any given time. Utilizing this framework will allow therapists to work with families and caregivers in the natural environment of the child. This model fits well in an educational-based setting, where Early ACCESS services are provided. It also facilitates interdisciplinary collaboration, which is common and necessary among a team of parents and professionals to ensure the quality of services for children and families. This model emphasizes the importance of using familiar tasks to ensure understanding and follow-through by the parents and caregivers targeted in this project (Kramer, Hinojosa, & Royeen, 2003).

Occupational therapy is interested in the interrelationships of humans and their contexts, and the effect of these relationships on performance (Dunn, Brown, &
McGuigan, 1994), thus, supporting the goal of providing services within the natural environment using everyday tasks with the parent or caregiver and child.

While the Ecological Model of Occupation was the primary theory utilized throughout this scholarly project, other theories were used and reflected upon in the development of the feeding manual. The Adult Learning Theory was used in the development of the handouts with the focus of learning on applying knowledge and developing competencies in skills appropriate for the learner (Dreeben, 2010). The developmental theory was used as it is based on an understanding of typical development, where skills are mastered before the next level of skills is introduced (Case-Smith, Law, Missiuna, Pollock, & Stewart, 2010). The biomechanical frame of reference assisted by addressing adequate posture and positioning for the functional activity of feeding (Schuberth, Amirault, & Case-Smith, 2010). Implementation of this project will ultimately result in improved feeding skills, growth, and development of the child.

The literature review in Chapter II contains the findings from an extensive review of literature, which was completed to assist in the creation of this product. Materials used for this review included textbooks, research articles, and educational resources available to parents and occupational therapists. Chapter III is a description of the activities and methodology used to design the product. Chapter IV contains an introduction to the product, as well as the resource manual in its
entirety. Chapter V summarizes the purpose of the product, limitations, and recommendations for implementation.
CHAPTER II

REVIEW OF LITERATURE

Based on the literature reviewed in this chapter, there are various groups of infants and toddlers that demonstrate difficulties with feeding and transitioning to solid foods. The product of this scholarly project provides a manual for occupational therapists to help provide education and support for the families of these children. In order to have validity this type of product needs to be based on current research and literature. In this chapter you will find an explanation of typical infant progression to solid foods, and a review of the current research based treatment strategies to promote feeding skills.

The Newborn

After completing a review of the literature and research currently available, the following areas were found to be relevant to this project and were consistently supported through the research: an understanding of typical feeding skill development is important, preterm infants and medically complex infants are at a greater risk for delay, there is a need for support for the families of these children, the parent-child interactions and family education both have significant correlation
with improving feeding skills, and treatment strategies are available that have demonstrated improvements with the feeding skills of infants and toddlers.

A newborn, or neonate, refers to an infant's first month of life. A full-term pregnancy is considered either 37 or 38 weeks to 42 weeks. An infant is considered pre-term if they are born before 37 weeks, and is considered post-term if they are born after 42 weeks (Hunter, 2010). An infant considered to be of average size weighs above 2500 grams (5.5 pounds). Low birth weight (LBW) refers to a birth weight of 1500-2500 grams, and very low birth weight (VLBW) refers to 1000-1500 grams. Additionally, extremely low birth weight (ELBW) is considered less than 1000 grams (Hunter, 2010). While many births are uncomplicated, there are times when neonates may require supplemental medical management. This care may occur in a Neonatal Intensive Care Unit (NICU), with specially trained staff to assess the specific needs of the infant. Infants that come from nurseries may have had respiratory or nasogastric (NG) support, which can impact their health and development. These infants often leave the hospital setting requiring additional support and care. Oral motor skills and the infant's ability to transition from liquids to solids may be compromised as the infant continues to grow and develop (Burklow, McGrath, Valerius, & Rudolph, 2002; Hawdon, Beauregard, Slattery, & Kennedy, 2000).
Typical Infant Progression to Solid Foods

Authors have shown there is a typical progression with the development of feeding skills. It is important to have an understanding of the typical feeding skill development in order to be able to support the unique needs that infants with feeding issues may have.

A newborn baby forms a seal around a breast or bottle nipple using the lips, tongue, and jaw. The newborn coordinates sucking and swallowing with his breathing, which is referred to as the suck-swallow-breathe rhythm, or sequence (Ernsperger & Stegen-Hanson, 2004). From the newborn stage to three months, this sequence continues to become more rhythmic and organized. Palmer & Heyman (1999) suggest that a mature sucking pattern is observed in infants after 40 weeks’ gestational age. Most typical infants require 300 sucking and swallowing motions to consume 60 ml, or two ounces, in five minutes (Fraker & Walbert, 2003). At around three months, the infant may be able to complete twenty sucks from a breast or bottle, prior to needing a breath. Infants begin with taking in anywhere from two to five ounces, and by three to four months are often taking in six to eight ounces. During these months, the tongue will protrude outward if stimulated by something on the anterior part of it. This causes difficulty if attempting to feed an infant by spoon, as the tongue will respond reflexively, and push the food forward out of the infant’s mouth (Fraker & Walbert, 2003).
From four to six months, infants use longer sequences with their suck and swallow prior to their breath. The infant will demonstrate head control and will be able to sit with support. Typical infants at this age require four to six feedings of 7-8 ounces of liquid daily (Ernsperger & Stegen-Hanson, 2004). Soft, smooth solids, or baby foods, are typically introduced between four and six months (Morris & Klein, 2000). At this age, the motor ability and tongue movements to manage food from a spoon without pushing it away from the mouth have developed. The tongue may continue to protrude at the point of swallow (Ernsperger & Stegen-Hanson, 2004). At six months, a cup may be introduced, with the infant using a suckling pattern to drink. Much of the liquid may be lost, with the infant taking continuous sucks followed by moments of uncoordinated swallowing (Fraker & Walbert, 2003).

During the six to nine month period, infants begin taking in ¼ to ½ cup servings of baby food, in addition to three to four feedings of breast-milk or formula a day (Fraker & Walbert, 2003). Infants also begin feeding themselves baby cookies, graham crackers, and other simple finger foods, along with lumpier, and slightly more textured foods such as applesauce (Morris & Klein, 2000). They explore fingers, clothing, and toys throughout this age range by taking these objects to their mouth for sensory discovery (Ernsperger & Stegen-Hanson, 2004). Cup drinking continues to improve, and the infant usually takes up to three sucks before stopping to breathe (Fraker & Walbert, 2003). Between seven and nine months, infants typically sit in a highchair for feedings.
From ten to twelve months, infants increase the variety of foods eaten, typically eating fruits, vegetables, meat/cheese, and grains. Infants in this age group begin to explore ground, mashed or chopped soft foods with small lumps (Ernsperger & Stegen-Hanson, 2004; Fraker & Walbert, 2003; Morris & Klein, 2000). More mature chewing patterns continue to emerge, and tongue lateralization begins to occur. Infants continue to improve with the cup and swallowing follows sucking without pauses. Liquids are primarily taken from a cup, though the breast or bottle may continue at bedtime (Ernsperger & Stegen-Hanson, 2004). Straw drinking may also be taught to the one-year old child.

From twelve to fifteen months, children are able to use a munching pattern to eat solid foods and continue to improve with tongue lateralization. They continue to eat a variety of foods and should be exposed to mixed textures, along with beginning to eat coarsely chopped table food. Now children are ready to begin to separate the lumps that are ready to be swallowed from those that require more chewing (Ernsperger & Stegen-Hanson, 2004; Morris & Klein, 2000). They feed themselves using a pincer grasp, and are able to hold and drink from a cup. They are able to sequence at least three suck-swallows while drinking one ounce or more without a drastic pause (Fraker & Walbert, 2003). Little spilling occurs during drinking by this age.

From fifteen months to two years of age, children continue to improve feeding skills. The 18-month old child is able to self-feed using fingers or a spoon.
and drink from a cup independently (Ernsperger & Stegen-Hanson, 2004). They continue to work on being able to chew foods with a rotational pattern, close their lips while swallowing foods without loss of food and saliva, and are able to use a sustained, controlled bite on a hard cookie. Children at this age are able to eat a variety of coarsely chopped table foods, foods with mixed textures, and soft meats (Fraker & Walbert, 2003). Around two years of age, personal tastes and preferences begin to emerge, which affect the types of foods children may eat (Ernsperger & Stegen-Hanson, 2004). Overall, these feeding skills are seen as a development over time, with the typical infant or child progressing through the various stages without difficulty. As summarized in the following section, many infants and children have difficulty with this progression and the transition from liquids to solid foods.

Infants with Feeding Issues

Typically developing infants may demonstrate difficulties with feeding skills during stages of transition. Numerous groups of infants and children have been identified to be at risk of experiencing feeding issues and difficulties. Premature birth, medical conditions, and developmental delays may significantly impact a child’s ability to gain nourishment in a typical or predictable manner.

When looking at preterm infants, studies support an increased likelihood of feeding difficulties for the infants who are categorized as low birth weight or low-risk premature. In a review of the literature, Hutchinson (1999) found that low birth weight infants were twice as likely to have feeding difficulties as infants that
were carried to full term. Silberstein et al. (2009) looked at 97 low-risk premature babies weighing more than 1000 grams and over 30 weeks at birth. They found that 30% of the infants presented with feeding difficulties during the transition to oral feedings. The authors reported that infants that showed less intact neurobehavioral functioning in the neonatal period had difficulties during the transition to oral feeding and had less optimal mother-infant feeding interactions. This study supported the premise that low-risk premature infants with poor neurobehavioral functioning should receive special attention and care (Silberstein et al., 2009).

Children that are born preterm with extremely low birth weight (ELBW) face a greater risk for developmental delays than full-term infants. These infants are born weighing less than 1000 grams, or less than 2 pounds 3 ounces. In a study comparing ELBW children and their full-term siblings, the preterm infants were found to be lighter and shorter and to have a smaller head circumference than their full-term siblings; they were also at a greater risk for having lower cognitive and language scores (Kilbride, Thorstad & Daily, 2004).

Burklow, McGrath, Valerius and Rudolph (2002) completed a study of 143 medically complex infants and compared those that were born premature with those that were carried to full term. While there was no significant difference in the first oral feeding of bottle or breast, the babies born before 35 weeks gestation were significantly more likely to have problems with their first solid feeding than children born after 35 weeks. The data from their study supported that all medically complex children, especially those with an early need for respiratory support, will
benefit from ongoing oral-motor feeding intervention, and that the medically complex preterm infant will benefit from interventions after discharge to support successful transitioning to solid foods and to prevent feeding difficulties.

Feeding behaviors of preterm infants with and without bronchopulmonary dysplasia (BPD) have also been studied and compared. In a study by Howe, Sheu, and Holzman (2007), infants with BPD were defined as those requiring oxygen at more than 28 days of life. The preterm infants included in the study were born at a gestational age of less than or equal to 34 weeks and did not have any major cardiac, gastrointestinal, or congenital impairment. The premature infants with BPD achieved full oral feeding significantly later than those premature infants without BPD. The majority of infants in both groups did not demonstrate a mature sucking pattern upon discharge from the hospital; this was not surprising as the authors conclude that a mature sucking pattern is not typically observed in infants until after 40 weeks of gestational age.

Field, Garland, and Williams (2003) sought to determine whether similar feeding problems are associated with specific conditions or diagnoses. Through chart review and interdisciplinary evaluation, it was determined that up to 80% of children with developmental disabilities experience problems with feeding. The authors categorized the feeding problems and discussed motivational behaviors that interfere with feeding, as well as skill-based behaviors that are found to inhibit feeding. Motivationally-based problems can develop when parents and/or
caregivers give attention to a child's eating behaviors by offering rewards for eating, provide the preferred foods in place of what is being served, or allow the child to escape meals due to inappropriate behaviors. Skill-based behaviors related to feeding are thought to be a result of a medical condition, congenital problem or a developmental issue and occur because a child lacks the necessary skills for eating. While the study data did not confirm that there were causal relationships between feeding problems and the medical conditions studied, it was determined that children with similar medical diagnoses faced similar feeding difficulties. Children with special needs, or medical conditions, have a higher risk of acquiring feeding problems and while many of the feeding issues are the result of learned aversions, providing families with tools and knowledge to respond to these motivationally-based and skill-based feeding behaviors would be beneficial (Field, Garland, & Williams, 2003).

The review of literature by Hutchinson (1999) also supported that medical conditions in early childhood, such as: reflux, ear, nose, throat disorders, respiratory, or cardiac disorders, and children that have early aversive feeding experiences, or delays in motor milestones were likely to have feeding difficulties. Hutchinson determined that children with feeding difficulties should be identified promptly, and that children with low birth weight, developmental delay or frequent vomiting should be monitored specially for the development of feeding difficulties. The author also suggested that children with feeding difficulties be under the care of a multidisciplinary team, and that parent support groups should be established and
encouraged to reduce the stress and anxiety, and to address the practicalities of behavioral management.

Bazyk (1990) reviewed the medical records for infants under one year of age that had been fed by a nasogastric (NG) tube within the first six months of life and had a physician's order for oral feeding within the first year of life. It was determined that factors such as lower gestational age at birth and the presence of a number of significant medical conditions correlate to an increased length of transition time to oral feeding. Digestive, respiratory, and cardiac complications were found to be the strongest predictors of a longer transition to oral feeding, thereby indicating that these systems may play an important role in the transition to oral feeding. Gastroesophageal reflux was the most common digestive complication and most significant predictor of an increased length of transition to oral feeding. This study supported the short term use of nasogastric tube feeding and promoted the consideration of placing a gastrostomy tube for infants not likely to progress to oral feeding within two months of nasogastric tube placement.

In a study by Hawdon, Beauregard, Slattery, and Kennedy (2000), data indicated that neonates who were disorganized or dysfunctional with feedings in the NICU were significantly more likely to experience difficulties as they transitioned to solid foods at six months, and that they continued to experience difficulties at twelve months. The findings from this study demonstrated strong
support for the gradual increase of textures and tastes offered, and supported the need for parents to receive more formal advice and training regarding feeding.

**Family Issues and Education**

There is a strong need to provide education to parents of infants and toddlers with feeding difficulties, and there is increasing evidence that the education should be provided in the natural environment for the child. While this is a shift away from traditional practice within a clinic-based setting, Pilkington (2006) supported that the result is enhanced outcomes for the child and family. The author demonstrated that the ultimate outcome of Part C Early ACCESS is to support and build the parent’s capacity for caring for their child. The fundamentals of occupational therapy practice are addressed with therapists practicing in the natural environment, coaching parents, and collaborating with team members. Learning takes place in the context of relationships, which can occur with siblings, extended family members, and other familiar individuals, and occupational therapists can bring their therapeutic use of self to all interactions by coaching and guiding, rather than by directing and doing. Pilkington (2006) also noted that building relationships with the parents is as important as the content of developmental interventions. Coaching should be collaborative, reflective, and reciprocal, with therapists asking open-ended questions to promote mutual understanding. Additionally, support materials must be written in an easy-to-read, family-friendly manner. Occupational therapists can implement this with all family education
material that is developed. This is important information to understand as authors have demonstrated that there are specific transition times with food when parents need and benefit from additional support.

There is information in the literature that suggested that there is a need to look at the feeding relationship between the parent and child (Satter, 1990). To prevent feeding problems, the author stated that professionals should consider teaching and supporting positive feeding dynamics and referring parents for instruction in positive approaches to feeding when needed. Parenting is more effective when the mother is supported, and training in sensitivity and responsiveness to a child’s cues is vital to effective feeding.

A clinical trial was conducted by Pridham et al. (2005) in which mother-infant pairs were studied to determine the effect of guided participation on feeding competencies of mother’s and their premature infants. It was proposed that guided participation would enhance a mother’s relationship with her infant by increasing her caregiving skills, promoting problem solving regarding the needs of the infant, and managing the emotions and expectations of caring for a premature infant. This guided participation included an experienced person with technical knowledge and skills providing guidance to the mother who was learning and developing skills through experience and participation. In this study, the guided participation included a weekly home visit by a nurse throughout the first month after the infant’s hospital discharge, with subsequent weekly, biweekly, or monthly home visits based
on the infant's condition, family circumstances, mother's availability, and the extent of her need for support with feeding. The authors concluded that overall, mothers and infants benefitted from guided participation through greater competency in regulating negative affect and behavior during feeding at one or more times within the first post-term year compared with those receiving standard care, which included the usual medical and therapeutic services provided by the hospital special care nurseries, primary care providers, specialist physicians, and developmental therapists (Pridham et al., 2005).

After studying premature infants, White-Traut and Norr (2009) provided support that premature infants are at increased risk for poor health, feeding difficulties, and impaired mother-infant interaction, which can lead to developmental delay. The authors supported that there is a need for parents to have interventions that address the difficulties and stress often faced with feeding premature infants.

Howe, Sheu, and Holzman (2007) studied preterm infants with and without the diagnosis of bronchopulmonary dysplasia (BPD). The authors confirmed the importance of educating parents and caregivers of infants by allowing hands-on practice. In this study, it was suggested that education ensured post-discharge follow-through. The authors also suggested that the primary caregivers' understanding of the reasons for specific feeding strategies would contribute to
greater compliance, thus ensuring a safer and more successful outcome for the infant.

It is imperative for parents, caregivers, and therapists to recognize the importance of very early feeding interactions with infants. The Mother-Infant Feeding Tool (MIFT) is an observational tool that was designed by Brown, Thoyre, Pridham and Schubert (2009) to assess mothers and their premature infants during feeding. These authors included forty-three mother-premature infant dyads in a study following discharge from the special care nursery and again at 1 and 4 months post-term age. The authors, using the MIFT as an assessment tool, found that as infants grew older, mothers talked less to their infants and spent less time repositioning the nipple during feedings, which correlated with less dysregulation, or infants choking due to their inability to suck, swallow, and breathe in a coordinated manner.

Literature supported the need for quality home visits and perceived family improvements among families of low-income status. Families who perceived that they improved more in an Early Head Start Program had higher scores for home visitor facilitation of parent-child interaction, as well as, higher scores for parent engagements during home visits when compared to families who had the perception of less improvement (Roggman, Boyce, Cook, & Jump, 2001). According to the authors, this information is significant to the implementation of parent education as it supported the strong need for engagement during home visits, as well as
emphasizing the importance of the parent-child interaction. The concept of partnership between the therapist and parent toward the child is both beneficial and valuable when looking for success indicators.

The Infant Feeding Series (TIFS) by Brophy-Herb, Silk, Horodynski, Mercer, and Olson (2009) was a newly designed curriculum that was introduced during a pilot study to low-income mothers. The curriculum was sequentially designed with one-hour lessons on infant feeding practices over a six-week period of time. The lessons were designed to: 1) teach the mother about infant nutrition and feeding practices, 2) support the mother in recognizing solid readiness cues, 3) identify alternatives to introducing solids too early, 4) help the mother create a feeding plan, 5) build self-efficacy surrounding feeding practices and choices, and 6) support mothers confronted or confused by advice from family and friends that is contrary to the recommendations of the American Academy of Pediatrics. The authors of TIFS used the study to determine if the mothers would delay the introduction of solid foods until their infant was 4-6 months old, the age recommended by the American Academy of Pediatrics, in order to decrease the risk factors associated with later health problems such as allergies, overweight, and diabetes. The authors noted that family members and pediatricians commonly suggested the addition of cereal to an infant’s bottle to treat acid reflux despite the infant’s developmental readiness, which can sacrifice the infant’s future medical health. It was found that mothers educated using The Infant Feeding Series (TIFS) had greater knowledge about feeding practices and were more accurate in identifying infant engagement.
cues. This study acknowledged that educating mothers regarding feeding practices was beneficial for both the mother and infant as evidenced by all mothers, with the exception of one, waiting until their child demonstrated developmental readiness, which occurred between the ages of 4 and 6 months, to introduce solid foods (Brophy-Herb, Silk, Horodynski, Mercer, & Olson, 2009).

In a pilot study that looked at the use of a parent-child interaction scale with young children with failure to thrive, Stewert and Meyer (2004) found that interaction scores were below the 10th percentile, indicating low levels of mutually adaptive interactions, in 2 of 5 dyads. This was not during a feeding event. They also found that interaction subscores revealed low performance in three of the mothers, and that irregular sleep and feeding patterns were found in 4 of 5 children. This pilot study confirmed that when a child has a feeding problem, the caregiver may need support to learn how to adapt the feeding routines, adjust the sleep schedules, and alter play activities so the child’s biological and psychosocial needs are met. This study supported the need for therapists to consider measures to assess the parent-child interactions, and to obtain information on sleep and feeding routines when evaluating children with failure to thrive.

A study by Dunbar, Jarvis, and Breyer (1991) supported early and ongoing family involvement to provide oral experiences for children who have been fed by non-oral means for prolonged periods of time. Fraker and Walbert (2003) provided guidance that it is important to address the needs of infants with feeding tubes by
assisting the infant or child with preserving their sucking and swallowing patterns, providing positive oral experiences, and reducing negative oral experiences.

Humphrey (2002) proposed a model addressing change at a different level than typically thought of: the child’s occupation. Humphrey defined occupation as culturally valued, coherent patterns of actions that emerge through transactions between the child and environment and as activities the child either wants to do or is expected to perform. Developmental changes, the acquisition of new skills, and the refinement of performance are conditions that are the result of engaging in occupation. Humphrey noted that peer modeling through family members and peers is crucial to interventions and that it would be difficult to justify serving a child with delays if the significant people in his life were not an integrated part of the process of the child’s learning and occupation.

Role of the Occupational Therapist

Occupational therapists are often recognized as one of the primary support service personnel for an infant or child with an eating or feeding difficulty. However, services may be more comprehensive and beneficial with an occupational therapist serving as part of a team working to support and educate the families of the children they serve. Miller, Burklow, Santoro, Kirby, Mason and Rudolph (2001) supported the role of an Interdisciplinary Feeding Team in treating medically complex children experiencing feeding or eating problems to help prioritize treatment strategies and limit the opportunity for a feeding problem to worsen. The
authors presented an ideal scenario for a medically complex child undergoing a feeding assessment to include a team of individuals, including a nurse coordinator, registered dietician, speech language pathologist, occupational therapist, pediatric psychologist, and medical director/physician. A team approach, with time for the medical professionals to discuss and prioritize treatment strategies, provided an evident benefit for families, in that, the number of appointments is limited and families are provided with a concise plan to follow when they get home in their natural environment.

Occupational therapists (OTs) and occupational therapy assistants (OTAs) play an important role in evaluating and providing intervention for feeding, eating, and swallowing problems. Clark (2007) emphasized, “the interplay of medical and developmental factors is complex and requires advanced-level knowledge to provide safe and effective service” (p. 687). OTs and OTAs demonstrated an individualized progression from entry-level knowledge and skills to advanced-level knowledge and skills, however, these skills are prompted and developed through experience.

**Evaluation**

Research literature was studied to examine the ways that occupational therapists evaluate and assess the children and families that are requesting support in the area of feeding. Clark (2007) revealed that comprehensive evaluations include the selection, administration and interpretation of assessment measures,
which are completed by trained occupational therapists. Occupational therapy assistants may gather data and administer selected assessment tools or measures for which they have demonstrated competence.

When looking at the initial evaluation, Arvedson (2000) offered guidelines for obtaining a medical, developmental, and feeding history, carrying out a physical evaluation, and observing a typical meal/feeding evaluation. In *The Manual of Paediatric Feeding Practice*, McCurtin (2008) provided additional support and information on areas that are frequently assessed and looked at during treatment interventions. Evaluations should always include pertinent medical history relating to the pregnancy and birth, current medical diagnoses, use of medications, and feeding history. Additional assessment areas include motor areas, equipment, nutritional, oral-motor, environmental, behavior, and associated conditions. The motor areas involve the overall motor skills and general body tone, positioning, and self-feeding skills. Equipment includes seating equipment needed, and utensils used. Nutritional areas include the method of feeding, amount of intake, food consistencies, range of tastes, and current weight. Oral-motor areas include anatomical structures, limiting patterns and effects, sucking, swallowing, and sensation. Environmental areas include the dynamics between the feeders and infants, feeding routine, environmental stimuli, and any socio-cultural factors that may affect feeding. Behavior includes behavior and mood before, during and after feeding, in addition to responses to initiation and changes in feeding. Throughout the evaluation, the occupational therapist should be looking for associated
conditions consisting of signs and symptoms of reflux and/or aspiration, evidence of a compromised respiratory system, and evidence of endurance/cardiac difficulties (McCurtin, 2008).

Fraker and Walbert (2003), McCurtin (2008), and Wolf and Glass (1992) supported that assessment should include the state of alertness, reflexes, sucking and swallowing and overall infant cues. Maune (2007) recommended assessing the sensory environment, as well. This included noise, lighting, activity, temperature, and movement. This author also supported looking at the infant's state control and organization during assessment of feeding tasks.

The Parent-Nutrition Feeding Questionnaire by Campbell and Kelsey (2002) was designed to use with parents of children age 0-5 years. This questionnaire can be given by any professional working with a child. There are questions regarding feeding skills and medical issues which result in a numeric score. An occupational therapist should be notified to determine if further screening and assessment is warranted for infants and children with scores of a four or greater.

The Center for Disease Control and Prevention (2010) has developed a U.S. Growth chart for boys and girls that provide a percentile for height and weight based on age in months. This information is useful for occupational therapists when determining if a child's weight is of concern when addressing feeding skills. The occupational therapist is also able to use this chart to determine if a child is progressing on the growth curve.
Occupational therapists may utilize the results of a videofluoroscopic swallow study in the evaluation of feeding and eating difficulties. Aspiration and penetration are conditions that occur when food or liquid enter the airway. These conditions can have a significant impact on the health of a child. If aspiration or penetration is suspected, children are often referred for a feeding and swallowing assessment, typically including clinical evaluation and a videofluoroscopic swallow study (VFSS). In their study, DeMatteo, Matovich, and Hjartarson (2005) sought to determine when a clinical evaluation is sufficient for diagnosing these conditions and when a VFSS is necessary as part of the evaluation process to guide clinical decision-making and ensure safe, efficient, cost-effective, and quality care of children. The findings indicated that the clinical evaluation correctly identified 92% of the children aspirating on fluids and 46% of the children who did not aspirate on fluids. However, aspiration of solids was not detected accurately with clinical evaluation alone in this study. Silent aspiration, or aspiration without symptoms, was found at a rate of 94% in this study. This study suggested that solid aspiration and penetration is more difficult to determine based on clinical evaluation alone. The use of videofluoroscopic evaluations can assist occupational therapists in providing accurate and safe recommendations for feeding and swallowing.

Intervention

There are many interventions for feeding difficulties that are supported by researchers. An occupational therapist develops an intervention plan following
evaluation, however, both occupational therapists and occupational therapy assistants participate in selecting, administering, and adapting activities to support children and families in the intervention phase of service (Clark, 2007). Interventions can consist of positioning, scheduling, environment, texture progression, behavior, and parental support. Fraker and Walbert (2003) and McCurtin (2008) provided therapy guidelines that address food consistencies, positioning, reflux, spoon-feeding techniques, and behavior.

**Environmental Interventions**

Maune (2007) looked at the sensory aspects of feeding that should be considered and addressed when looking at feeding difficulties and interventions, using a sensory integrative frame of reference as the focus. Maune (2007) reported that with typical development, feeding is initially reflexive and moves into successful engagement in sucking, swallowing and digestion. There was also a positive experience for the infant with being held close, and feelings of comfort. Tactile processing allowed for the rooting reflex and overall intact sensory processing is critical for successful, coordinated feedings, and achieving the optimal infant “state.” Feedings are a reciprocal process between the parent and child, and parents must be sensitive and responsive to cues from the child (Maune, 2007).

There are critical sensitive periods for the acquisition of feeding skills, when the child’s maturation and opportunities to learn a new skill coincide. When looking at intervention ideas for bottle feeding, Maune (2007) suggested a six week
old might benefit from: swaddling during feeding, use of a “football hold”, decreasing light touch input during feedings, and use of a firm input for position changes and burping. Satter (1990) provided additional guidelines for a 2-3 month old, including: hold the bottle still, stimulate the rooting reflex by touching the cheek, touch the nipple to the infant’s lips, and let the baby open his mouth, get the nipple to flow at the right speed, talk and smile without overwhelming the baby, and avoid disrupting feeding with unnecessary wiping and burping. For infants from six to thirty-six months, guidelines provided by Satter (1990) suggested talking in a quiet manner, seating the infant straight up and face forward, waiting for the infant to pay attention and open his mouth, letting the infant touch the food, and allowing the infant to feed himself with his fingers. Hanson (2004), Morris and Klein (2000) provided further support that when feeding the infant, parents should offer food from the spoon, but should wait for the infant to give permission to put it in their mouth.

As children move into the toddler age, Maune (2007) provided intervention ideas for a toddler including: having a schedule for meals and snacks, providing a consistent seated location for mealtimes, avoiding distractions, providing preparatory activities for the body and mouth prior to mealtimes, using transitional activities prior to coming to the table, gradually increasing interaction with foods, offering small portions of new foods paired with familiar foods, using positive reinforcement, and modeling the eating process. Ernsperger and Stegen-Hanson (2004) suggested that it is critical to offer the child at least one preferred food item.
at every meal and/or snack along with new foods for the child to explore. White-Traut and Norr (2009) provided additional support for creating a quiet home environment when feeding to achieve optimal feeding benefits.

Arvedson (2000) reported that postural stability is necessary for refined movements in the oral cavity. Recommended positions for feeding an infant up to three months may include a variety of positions from supine, with the head slightly elevated, to sidelying, to a semi-supported position. The infant may need to have swaddling, or support of the head or chin, during feedings (McCurtin, 2008). As the infant gains strength, he typically moves to a semi-supported sitting position until around seven months, when the infant will often be sitting independently. During this time, it is important that additional support, through a highchair or feeder seat, is provided in order to allow the infant the ability to work on feeding skills, without having to concentrate on sitting skills (McCurtin, 2008). A rolled towel may need to be used to maintain upright alignment of the head and neck. Overall, infants need to maintain a position of flexion, which will include head flexion, or a chin tuck during feeding (McCurtin, 2008; Morris & Klein, 2000). Ernsperger and Stegen-Hanson (2004) encouraged that the child's hips, shoulders and head to be in alignment to support effective and safe eating and swallowing, as well. Additionally, children benefitted when their arms were supported through swaddling or by a tray and when their feet were supported through positioning by the feeder's body, swaddling, or use of a footrest (Ernsperger & Stegen-Hanson, 2004; McCurtin,
Food presented slightly below the mouth with the feeder positioned at the child's eye level during the meal was recommended (McCurtin, 2008).

There was also evidence that supported that a feeding schedule was relative and important for children. Ernsperger and Stegen-Hanson (2004) advised that it is difficult for children to regulate their hunger and satiation if there is not a schedule for snacks and meals, therefore, families should be encouraged to have a consistent and predictable daily mealtime routine. These authors stressed that the schedule is not intended to increase anxiety; if a child is indicating hunger at a certain time each day, the schedule should be adjusted to accommodate a meal or snack at that time. Fraker and Walbert (2003) and Linden, Paroli and Doron (2000) suggested that there should be a schedule of three meals and two to three snacks per day. Arvedson (2000), Fraker and Walbert (2003) and McCurtin (2008) agreed that mealtimes should last twenty to thirty minutes, and snacktimes should last fifteen minutes at the maximum. There should be no grazing in between the scheduled times, but children may have water in a cup or bottle, if needed. Milk should be the only liquid allowed at meals and snacks, and should not be consumed outside of those times (Ernsperger & Stegen-Hanson, 2004). In addition, Linden, Paroli, and Doron (2000) provided ideas for picky eaters, including being persistent with offering foods multiple times if a toddler is not interested in it, and adding calories to the foods a child likes if he needs calorie boosters.
Providing a predictable routine was found to be beneficial for feeding. This included placing food and utensils where the child could see and anticipate them, using consistent people to feed and consistent equipment, feeding at regular times and intervals, and making changes gradual (McCurtin, 2008). According to Ernsperger and Stegen-Hanson (2004), the mealtime environment should be positive and nurturing, allowing the child to take the lead in learning about new foods. A dinner table is the ideal setting for eating and drinking to occur. It may take time for the child to become comfortable in this setting, as the child may have had several past negative experiences at the dinner table, including pressure to eat, coercion or punishment (Ernsperger & Stegen-Hanson, 2004).

It is also important to consider appropriate portion sizes for the child who is struggling with eating and feeding issues. Ernsperger and Stegen-Hanson (2004) and Linden, Paroli, and Doron (2000) suggested that one tablespoon of each food per year of age be considered a serving. For example, a two-year old child should receive approximately 2 tablespoons of peas at a meal as a serving of vegetables. It is beneficial for the child to start with a smaller portion, thereby, encouraging success by allowing the child to see the results after just a few bites.

*Texture Progression*

It is important to progress the textures of food, in addition to providing a variety of foods, for infants in their first year of life (Hanson, 2004). Chatoor and Ganiban (2003) supported this practice by emphasizing that the early introduction
of a variety of foods at an early age, preferably in the first year of life when infants are less likely to discriminate their food preferences, is of significant importance. Lansky (2004) provided ideas for finger foods for babies six to nine months old, ten months to one year old, and for babies one year and older.

There are times when infants and young children have difficulty with transitioning from pureed foods to more lumpier table foods. This can be a result of decreased tongue movement and oral motor skills, or oral defensiveness and sensory difficulties (Morris & Klein, 2000). Many times this resulted in gagging or choking by the infant or child with the child then resisting additional lumpy or textured food. Fraker and Walbert (2003) provided strategies to assist with more successful transitions. These include mixing ¾ baby food with ¼ real food that has been blended with a food processor or blender and gradually increasing the ratio as the infant tolerates the texture and taste of the table food. Another strategy provided by Fraker and Walbert included increasing the texture from smooth to lumpy by adding finely crushed crackers, pretzels, or vanilla wafer cookies into the pureed food, and gradually increasing the amount added or the particle size of the crushed food. Morris and Klein (2000) provided additional support that treatment interventions should focus on the gradual introduction of texture changes in foods.

The efficacy of texture fading in the treatment of food selectivity was studied by Shore, Babbitt, Williams, Coe, and Snyder (1998). Texture progression for this study was presented as pureed food, junior foods, ground foods, and chopped fine
foods. The fading technique described by the authors in this study combined 75% of a successful texture with 25% of the next texture, followed by 50% of a successful texture with 50% of the next texture, followed by 25% of a successful texture with 75% of the next texture, followed by 100% of the next texture. Meals progressed in texture as the child demonstrated 80% acceptances and swallows and less than 20% of expulsions and gags. Though the sample size in this study was small, the results demonstrated that texture fading, along with reinforcement for food acceptance and swallowing, and extinction of food refusal and food expulsion, was effective in helping children consume a higher textured food.

Mechanical: Oral Motor:

A preterm infant's sucking efficiency was reported to improve when provided with oral support (Einarsson-Backes, Deitz, Price, Glass, & Hays, 1994). This technique was supported by the results of a study of preterm infants by Howe, Sheu, and Holzman (2007). When they provided oral support to infants with bronchopulmonary dysplasia (BPD) and infants without BPD, sucking efficiency improved. The authors found that premature infants appeared to benefit from oral support, regardless of the presence of chronic lung problems, and that BPD was not a contributing factor to the feeding issues.

According to Ernsperger and Stegen-Hanson (2004), children may have difficulty with chewing due to oral-motor difficulties or low muscle tone. Children with low muscle tone must exert a lot of effort to chew or drink due to the jaw and
neck alignment associated with low muscle tone. These children may bite on the edge of a cup for stability in an effort to gain oral-motor control. Children with oral-motor difficulties may benefit from foods such as raw carrots, raw celery, beef jerky, licorice twists, and sugar-free bubblegum to increase extended chewing and chewing without drooling. A thin, porous bag made of polyester organza or cheesecloth can be used to wrap a bite-size piece of food and placed on the molar surface of the child’s mouth. This enables the child to taste the food without the risk of having pieces of food in the mouth. Another chewing intervention that Ernsperger and Stegen-Hanson recommended was moving long strips of food, such as pretzel sticks or cheese puffs, slowly into the mouth. The authors suggested approaching with the food from the side of the mouth and having the child use a rhythmical biting and chewing pattern.

Arvedson (2000) reported that chewing is a lateralized performance that develops over time. Morris and Klein (2000) supported that treatment should focus on helping the child learn to control moving the textured food in his mouth using tongue lateralization. Eckman, Williams, Riegel and Paul (2008) stated that in addition to neuromotor deficits, another cause of chewing problems could result from lack of appropriate early experiences. The authors of this study found that even some typically developing children did not develop chewing skills because of lack of exposure to textured food. These authors added to the research literature with a structured intervention used with two children with special needs to teach chewing. The intervention was designed to instruct each child to bite and chew,
improve tongue lateralization, improve lip closure, and increase the texture of foods eaten. Two types of sessions were established: chewing and texture-fading. Behavioral components of positive reinforcement through praise and tangible rewards were implemented. Planned ignoring was used to address inappropriate behaviors. Escape prevention was used if a child refused to take a drink/eat. Stimulus fading was used to systematically increase the texture of food eaten with progressively increasing the texture as it was tolerated. Shaping was used to improve chewing skills initially reinforcing each bite and moving towards the child progressively eating more bites prior to gaining access to the reinforcing toys. The intervention was determined to be effective in increasing the variety and texture of food eaten by both children. The authors suggested that using food rather than non-food objects prevents possible problems with generalization (Eckman, Williams, Riegel & Paul, 2008).

**Behavior**

Additional treatment strategies are those that focus on behavior. Arvedson (2000) stated that it is important to sort out if food selection or refusal is based on behavioral responses, physiologic responses, or a combination of them both.

In one study, strategies to improve feeding skills included the use of peer modeling, token deposits, or praise for each bite of food swallowed. Greer, Dorow, Williams, McCorkle, and Asnes (1991) demonstrated that rotating bites of food between a sibling or peer and a child with feeding difficulties was shown to be
effective with increasing food intake. Ernsperger and Stegen-Hanson (2004) affirmed that strong role models during meals are important. The authors suggested that the child be allowed to dish out the portion sizes to each family member or be given the opportunity to feed others at the dinner table, as these strategies are very empowering for the child who has experienced little power in the mealtime routine. Maune (2007) provided additional support that using positive reinforcement and modeling the eating process is an effective behavioral intervention for treating children with feeding and eating difficulties.

Dunbar, Jarvis, and Breyer (1991) supported the idea of behavioral intervention through a single-subject research design to evaluate children who had received non-oral forms of nutritional intake for longer than 1 month. The authors used occupational therapy intervention, in the form of behavioral management and play facilitation, to support the increase of oral intake by the children. The food was presented in a non-threatening manner using a developmentally appropriate play routine, such as feeding a doll or water play, to establish rapport with the child. Behavioral management consisted of shaping and positive reinforcement for desired behaviors. Negative behaviors, such as screaming and head turning, were ignored while the expectation of the child to demonstrate the feeding task remained consistent. The authors offered that an intensive inpatient-feeding program should only be considered after all other intervention strategies are ineffective and a medical reason for food refusal is ruled out. Dunbar, Jarvis, and Breyer also suggested that medical procedures performed in conjunction with feeding
treatment, minor illnesses and presentation of food during non-mealtimes inhibit the likelihood of oral feeding success.

Lewinsohn et al. (2005) identified and explored four dimensions of problematic eating behaviors which included: picky and highly selective eating, food refusal, positive or negative behaviors of parents, and struggle for control, in order to investigate the relationship and prevalence of specific behaviors surrounding eating experiences. The authors created an instrument, which they named the Oregon Research Institute Child Eating Behavior Inventory (ORI-CEBI), as a compilation of questions from other various screenings and questionnaires previously developed by researchers. Parents were asked to bring their infants in at 3, 6, 12, 24, and 36 months to fill out questionnaires, complete diagnostic interviews, and participate in lab experiments. The data collected at the 36-month assessment was studied and a correlation was found between struggle for control and pickiness, struggle for control and refusal, and between pickiness and refusal. Lewinsohn et al. concluded that positive mealtime behaviors exhibited from the mother and/or father may lead to fewer struggles for control on the part of the child, thereby, leading to less pickiness and food refusal.

Levy et al. (2009) studied infants and toddlers who demonstrated food refusal, poor feeding and other symptoms, such as vomiting and gagging. Using a descriptive study design, patients were separated into 2 groups: patients without an underlying medical condition that had been referred and evaluated for food refusal
and patients with a diagnosis, such as gastroesophageal reflux disease (GERD), milk allergies, etc. The authors found that the majority of patients with a behavioral source of symptoms exhibited failure to thrive, low intake with poor weight gain, or vomiting. An interview of the parent may provide clues to indicate a behavioral reason for refusal, such as decreasing or refusing oral intake during a transition in feeding method (bottle to spoon), traumatic event, or feeding at fixed intervals without any hunger cues from the child. Abnormal and intrusive feeding practices, such as nocturnal feeding, using distractions while feeding, and prolonged mealtimes are other items which were indicative of a behavioral cause for feeding difficulties that parents may report during a feeding history or interview (Levy et al., 2009).

Chatoor and Ganiban (2003) studied food refusal of infants and young children in order to define and distinguish between the various types of food refusal and explore the treatment strategies and interventions that may be utilized. According to the authors, unpredictable food refusal describes a child who may eat an occasional meal well, but typically takes a few bites and will refuse to eat any more, and selective food refusal refers to children who consistently refuse foods based on their texture, tastes, smell, color, food brand, etc. Sensory food aversions fall under this category of refusal as these children may eat without difficulty given a preferred food, but refuse all other food options.
The early introduction of a variety of foods at an early age, preferably in the first year of life when infants are less likely to discriminate their food preferences, is of significant importance. Also important is the fact that studies have demonstrated significant negative effects that coaxing, threatening, punishing, and distracting have on children's eating habits (Chatooor & Ganiban, 2003). Miller, Burklow, Santoro, Kirby, Mason, and Rudolph (2001) suggested that a behavioral program must be considered, or implemented, prior to an oral motor program because the severity of the feeding behaviors often prevent progress from occurring with an oral motor program.

**Parental Support**

When looking at interventions that were the most effective in the home environment, a review of 48 articles that described 56 interventions involving 7,350 families was completed by Bakermans-Kranenburg, Van IJzendoorn, and Bradley (2005). The results indicated that interventions of 5 to 16 sessions were more effective than those with more than 16 sessions. Interventions provided prenatally or later than 6 months of age had the greatest effect, as it is thought the family may need time to adjust to the new baby and new demands shortly after birth. Interventions taking place in the home were more effective than center-based interventions. The authors reported the learner is more likely to find success when there are a smaller number of very clear and highly integrated objectives in the area involved.

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After completing a review of the literature and research currently available, the following areas were found to be relevant to this project and were consistently supported through the research: an understanding of typical feeding skill development is important, preterm infants and medically complex infants are at a greater risk for delay, there is a need for support for the families of these children, the parent-child interactions and family education both have significant correlation with improving feeding skills, and treatment strategies are available that have demonstrated improvements with the feeding skills of infants and toddlers. The product of this scholarly project, *Feeding Strategies for Infants and Young Children*, was designed for use by occupational therapists to help educate and support families who have infants and young children with feeding issues. The methodology for the development of the manual can be found in Chapter III; the manual is included in its entirety in Chapter IV of this document, and Chapter V includes a summary and recommendations.
CHAPTER III
METHODOLOGY

As occupational therapists providing Early ACCESS services to families of infants and young children with feeding difficulties, it became evident that there were limited parent-friendly resources available to address this need. This scholarly project was to create a product that would enable occupational therapists to provide information to parents regarding the feeding skill development of their child in a simple, easy-to-understand format. The manual, *Feeding Strategies for Infants and Young Children*, will be beneficial for a wide variety of children and diagnoses; it was designed to be individualized based on the child and family needs, offering flexibility for the family. Overall, the purpose of this product was to assist occupational therapists in the education and support of families with children that experience feeding difficulties. The primary methodology used to create this product included an extensive review of the literature, including research articles, textbooks, and resources currently available to families and caregivers.

The review of the literature and research currently available revealed that infants and young children born prematurely or with medical conditions are at a greater risk for delay (Silberstein et al., 2009; Burklow, McGrath, Valerius, &
Rudolph, 2002; Field, Garland & Williams, 2003) and there is a need for supporting the families of these children. The literature also supported that family education and parent-child interactions have significant correlation with improving feeding skills (Pilkington, 2006; Satter, 1990; White-Traut & Norr, 2009). Occupational therapists play an important role in the evaluation and intervention for feeding, eating and swallowing problems (Clark, 2007). Treatment strategies are available that have demonstrated enhanced outcomes with feeding skills of infants and young children (Fraker & Walbert, 2003; Maune, 2007; McCurtin, 2008).

Resources currently available to parents were reviewed to provide the foundation for the development of this manual, which is intended to provide research-based strategies for families of infants and young children with feeding difficulties. It was discovered that currently available parent materials did not always present information in a quick, easy-to-reference manner. While the content was beneficial, a narrative format was often used making it more difficult to read and utilize. It was difficult to locate specific and appropriate strategies on a variety of topics within any single parent resource book. Therefore, information from a variety of current parent materials was compiled in order to create a manual that addressed a comprehensive, yet simplified approach to feeding.

The strategies provided within this manual are based primarily on the Ecological Model of Occupation. This frame of reference looks at the relationship between person, context and the task, and the impact that these variables have on
performance. Within this model, the person is considered an individual that has unique abilities and skills based on experiences, values, and interests. This would include the parent or caregiver and the child. The task is defined as an objective set of behaviors that are performed, or carried out, to accomplish a goal. These tasks that individuals participate in can form a person's role, or occupation. For this project, the task would be the development of feeding skills. Context refers to the interrelated conditions that surround the person. Temporal and environmental contexts are defined within this model. Temporal contexts include the child's chronological age, developmental stage or phase of maturation, and health status. Environmental contexts include physical, social, and cultural dimensions. Context variables include aspects that support or inhibit performance. Performance is when the person engages in tasks within a context. Once person, context, and task factors are identified, interventions can be considered (Kramer, Hinojosa, & Royeen, 2003). There are five therapeutic intervention strategies that address the person/context/task relationship within the Ecological Model of Occupation. See Figure 1 for intervention strategies and the examples as they relate to the development of this product.

When developing the product, considerations were made to ensure that our manual would be parent-friendly, and that the interventions were easy to understand and implement. The Adult Learning Theory was utilized in the development of the handouts contained within the manual. This theory emphasizes
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<th>Intervention Strategy</th>
<th>Definition</th>
<th>Project Examples</th>
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| **Establish/Restore**      | A strategy aimed at improving a person's skills by concentrating therapy efforts at the person's variable skills and deficits. May be facilitating the "establishment" of skills that a person has yet to learn, or "restoration" of skills lost due to illness or injury. | • Finger feeding, spoon use, & cup drinking  
• Improve the child's ability to eat more advanced textured foods (Fraker & Walbert, 2003)  
• Improve the child's oral motor skills necessary for manipulating foods within the mouth  
• Teaching the family to recognize and respond to the child's cues and behavioral state |
| **Alter**                  | A strategy focused on changing the actual context in which the task occurs. Emphasis on selecting a context that enables the person to perform with current skills and abilities (Dunn, Brown, & McGuigan, 1994). | • Change the location of meals from kitchen table to kitchen counter or outdoor picnic table  
• Invite a friend or same-age peer over for a snack or meal to allow modeling of the task (Maune, 2007) | |
| **Adapt/Modify**           | A strategy focused on modifying the context for performance or the components of a selected task.                                                                                                          | • Changing the consistency, increasing textures and increasing variety of foods  
• Placement of food for systematic desensitization (Toomey, 2002)  
• Positioning the child for optimal feeding including the use of a rolled towel for support (McCurtin, 2008)  
• Use of adaptive devices (cups, spoons, plates, bowls, non-slip surfaces, etc.)  
• Modifying the behavior of parents to soothe a fussy infant and create a quiet home environment (White-Traut & Norr, 2009) |
| **Prevent**                | A strategy aimed at changing the person, context, or task variable in order to affect a course of events.                                                                                                   | • Teaching parents/caregivers how to prevent or manage difficult feeding behaviors  
• Providing parents/caregivers information about the importance of adequate nutrition and ways to increase the calories of food (Ernsperger & Stegen-Hanson, 2004)  
• Providing information regarding benefits of establishing a routine  
• Proper positioning for the newborn, older infant, and toddler (Maune, 2007; Arvedson, 2000)  
• Could be used as a basis for all children, as we want to prevent poor or limited growth and poor nutrition |
| **Create**                 | A strategy focused on creating circumstances to support optimal performance for all persons and populations (Kramer, Hinojosa, & Royeen, 2003). This strategy does not assume a disability exists.             | • Providing expertise to families to assist with enriching the context and task related to the occupation of feeding  
• Create play activities involving food  
• Enhancing feeding skills of the children with difficulties, such as oral motor and chewing skills.  
• Providing guidance on benefits of eating with peers and modeling the task of eating  
• Reduce environmental stimuli, including auditory and visual stimuli (McCurtin, 2008)  
• Create a schedule for meals and snacks (Ernsperger & Stegen-Hanson, 2004) |
that adult learners appreciate learning which incorporates the demands of their
daily life, thereby, supporting a quick, easy to understand reference. Considering
the background knowledge and experience of the parents and caregivers, this
theory's focus involves active participation on the part of the adult learner, as well
as discussion and problem solving with the teacher, or occupational therapist
(Dreeben, 2010).

The developmental theory was also used in the creation of the feeding
manual, in that it is based on an understanding of typical development. Skills are
mastered before the next level of skills is introduced (Case-Smith, Law, Missiuna,
Pollock, & Stewart, 2010). The biomechanical frame of reference assisted the
development of the feeding manual due to this theory's focus on maintaining
adequate posture and positioning for the functional activity of feeding (Schuberth,
Amirault, & Case-Smith, 2010). An introduction to the product, as well as the
resource manual in its entirety, can be found in Chapter IV. A summary of the
purpose of the product, limitations, and recommendations for implementation is
included in Chapter V.
CHAPTER IV

PRODUCT

This manual was created to assist occupational therapists as they support and educate parents of children with feeding difficulties. It was designed to provide practical, useful strategies for parents to use as they feed their infant or toddler. The manual consists of easy-to-read, family-friendly handouts that can be provided to parents throughout the therapy process to provide a reference for the intervention strategies and information that have been suggested by the occupational therapist. This manual is not intended to replace the services of an occupational therapist, but rather should be a supplement to the support and education an occupational therapist provides to families.

The role of the occupational therapist in assisting families with feeding their child is clearly defined, in addition to the role of the parent in the feeding process. Environmental components, which include modifications or accommodations to the setting and a schedule for meals and snacks are included to provide parents with essential information to assist with creating a positive feeding experience for their child. Handouts with appropriate positioning for feeding a newborn, older infant and young child are critical pieces of information for parents and caregivers, as well. Lists of suggested foods for children as they transition from liquids and baby foods
to solid, table foods are included in the manual to ensure adequate oral motor skill development and sensory exploration among children throughout the food continuum.

Occupational Therapy and Feeding

Occupational therapists work in a variety of settings including hospitals, homes, daycares, and schools. Occupational therapists are trained to assess and provide intervention for a variety of issues that individuals face throughout their lifetime. Feeding is a primary area for occupational therapists to provide skilled evaluation and intervention support. Field, Garland, and Williams (2003) determined that up to 80% of children with developmental disabilities experience problems with feeding. The occupational therapist with advanced level skills in the area of feeding can provide strategies and ideas that may support the life-sustaining occupation of feeding.

The Family of a Child with Feeding Difficulties

There is a strong need to provide education to parents of infants and young children with feeding difficulties. Pilkington (2006) conveyed that supporting and building the parent's capacity for caring for their child results in enhanced outcomes for the infant or child. The author also noted that building relationships with the parents is as important as the content of developmental interventions. White-Traut and Norr (2009) studied premature infants and supported the need for parents to have interventions that addressed the difficulties and stress often experienced with
feeding premature infants. In a study by Howe, Sheu, and Holzman (2007), the importance of educating parents and caregivers of infants by allowing hands-on practice was confirmed. The authors also suggested that education ensured post-discharge follow-through.

Guiding Theories

The Ecological Model of Occupation was used primarily in the development of the feeding manual. The emphasis of this frame of reference is the relationship between a person, context and the task, and the impact that these variables have on performance (Kramer, Hinojosa, & Royeen, 2003). This manual concentrates on the effect that the context has on the task of feeding an infant or young child. It provides the family and/or caregivers with strategies to advance the task of feeding for infants and toddlers with feeding difficulties.

Additional theories were applied and utilized throughout this manual. The Adult Learning Theory was utilized in the development of the handouts contained within the feeding manual. Considering the diverse background knowledge and experience that individuals possess, it was important to recognize that information needed to be simple and conveyed in an easy-to-understand manner (Dreeben, 2010). The developmental theory was also used in the creation of the feeding manual. This theory recognizes the importance of a hierarchy in skill development, in that the child must master a task before another, more difficult task is presented (Case-Smith, Law, Missiuna, Pollock, & Stewart, 2010). Handouts provided in the
manual are based on this assumption, and provide the next steps, stages, and foods that are appropriate to offer an infant as he is able to master each skill level, and progresses in age. The biomechanical frame of reference assisted the development of the feeding manual due to this theory's focus on maintaining adequate posture and positioning for the functional activity of feeding (Schuberth, Amirault, & Case-Smith, 2010).
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We would also like to express appreciation to Joe Bustad for his contribution of the line drawing illustrations included within the manual. Clipart utilized throughout the manual was obtained from iClipart for Schools.
Purpose of the Manual

*Feeding Strategies for Infants and Young Children* was created to assist occupational therapists as they support and educate parents of children with feeding difficulties. Field, Garland, and Williams (2003) determined that up to 80% of children with developmental disabilities experience problems with feeding. Hutchinson (1999) found that low birth weight infants were twice as likely to have feeding difficulties as infants that were carried to full term. This manual was designed to provide practical, useful strategies for parents to use as they feed their infant or toddler.

Introduction

This manual consists of easy-to-read, family-friendly handouts that can be given to parents throughout the therapy process to provide a reference for the intervention strategies and information that have been suggested by the occupational therapist. It is intended that one or two handouts be provided in a single visit to ensure that parents and caregivers are allowed time to implement the suggested strategies into their daily routine before providing additional suggestions to work on. This manual is not intended to replace the services of an occupational therapist, but rather should be a supplement to the support and the education an occupational therapist provides to families.
Within the manual, the role of the occupational therapist in assisting families with feeding their child is clearly defined, in addition to the role of the parent in the feeding process. A typical feeding skill checklist is included that will allow an occupational therapist to monitor skills and record the date the skills were achieved. Environmental components, which include modifications or accommodations to the setting and information on scheduling for meals and snacks, are provided to equip parents with essential information to assist in creating a positive feeding experience for their child. Handouts with appropriate positioning for feeding a newborn, older infant and young child is a critical piece of information included for parents and caregivers, as well. A variety of feeding techniques and tips are offered for both infants and toddlers. Several handouts are included to assist young children as they learn to explore and accept a variety of tastes and textures. Suggestions and examples of foods for children as they transition along the food continuum are provided. This will help therapists and families ensure adequate oral motor skill development and sensory exploration among children. By providing information on the sequential stages for introducing solid foods, it is hoped that parents can be supported through information that will increase the opportunity for feeding success with their child. Also included in this manual is additional information on ways families can increase the calories in foods, techniques to add flavor and texture to foods, and suggested serving sizes for various ages. There are also additional resources that might be helpful to parents, including references to books and the U.S. Growth Charts.
Benefits

There is a strong need to provide education to parents of infants and young children with feeding difficulties. Pilkington (2006) conveyed that supporting and building the parent’s capacity for caring for their child results in enhanced outcomes for the infant or child. The author also noted that building relationships with the parents is as important as the content of developmental interventions. White-Traut & Norr (2009) studied premature infants and supported the need for parents to have interventions that addressed the difficulties and stress often experienced with feeding premature infants. In a study by Howe, Sheu, and Holzman (2007), the importance of educating parents and caregivers of infants by allowing hands-on practice was confirmed. The authors also suggested that education ensured post-discharge follow-through.

Guiding Theories

The Ecological Model of Occupation was used primarily in the development of the feeding manual. The emphasis of this frame of reference is the relationship between a person, context and the task, and the impact that these variables have on performance (Kramer, Hinojosa, & Royeen, 2003). This manual concentrates on the effect that the context has on the task of feeding an infant or young child. It provides the family and/or caregivers with strategies to advance the task of feeding for infants and toddlers with feeding difficulties.
Additional theories were applied and utilized throughout this manual. The Adult Learning Theory was utilized in the development of the handouts contained within the feeding manual. Considering the diverse background knowledge and experience that individuals possess, it was important to recognize that information needed to be simple and conveyed in an easy-to-understand manner (Dreeben, 2010). The developmental theory was also used in the creation of the feeding manual. This theory recognizes the importance of a hierarchy in skill development, in that the child must master a task before another, more difficult task is presented (Case-Smith, Law, Missiuna, Pollock, & Stewart, 2010). Handouts provided in the manual are based on this assumption, and provide the next steps, stages, and foods that are appropriate to offer an infant as he is able to master each skill level, and progresses in age. The biomechanical frame of reference assisted the development of the feeding manual due to this theory's focus on maintaining adequate posture and positioning for the functional activity of feeding (Schuberth, Amirault, & Case-Smith, 2010). It is hoped that this manual will provide the occupational therapist with practical, useful strategies as they work to support families of children with feeding difficulties.

Summary

Feeding Strategies for Infants and Young Children will be beneficial for a wide variety of children and diagnoses. It was designed to be individualized based on the child and family needs, offering flexibility for the family. Included within
the manual are handouts that offer useful strategies to promote advancement of feeding skills and assist with the progression of foods for infants and toddlers with feeding difficulties. These strategies can be easily interpreted by parents and caregivers with a variety of educational experiences and background knowledge. The handouts were developed to be easy for occupational therapists to reference while providing research-based strategies that can be implemented by parents and caregivers at home within a daily routine.

Bakermans-Kranenburg, Van IJzendoorn, & Bradley (2005) supported that interventions of 5 to 16 sessions were more effective than those with more than 16 sessions. Interventions provided prenatally or later than 6 months of age had the greatest effect, as it is thought the family may need time to adjust to the new baby and new demands shortly after birth. Interventions taking place in the home were more effective than center-based interventions. The authors also reported the learner is more likely to find success when there are a smaller number of very clear and highly integrated objectives in the area involved. It is hoped that therapists will be mindful in the development of their treatment plan with families, and selective with the handouts chosen for each family based on the individual needs of the child.
Occupational Therapy Services & You

**Occupational therapist role:**

- Work together with families to improve a child’s feeding skills
- Assessment of the child’s skills
- Assist with prioritizing treatment strategies
- Provide treatment interventions that support:
  - Positioning
  - Texture progression of foods
  - Oral motor skill development
  - Behavioral components
- Provide treatment in the natural setting (typically the home or daycare environment) to support consistency for the child
- Assist families in developing a routine, or schedule, while considering the daily demands placed on the family

**Parent role:**

- Provide time each day for child to work on feeding goals
- Ask questions when something is unclear or doesn’t make sense
- Partner with the occupational therapist

Reference: Clark (2007)
## Typical Feeding Skill Development

<table>
<thead>
<tr>
<th>Age in Months</th>
<th>Feeding Skill</th>
<th>Date Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4 Months</td>
<td>Hands to mouth</td>
<td></td>
</tr>
<tr>
<td>4-6 Months</td>
<td>Has head control</td>
<td>Hands on bottle</td>
</tr>
<tr>
<td>6-9 Months</td>
<td>Feeds self baby cookie</td>
<td>Mouths toys</td>
</tr>
<tr>
<td>10-12 Months</td>
<td>Drinks from open cup held by adult</td>
<td>Tongue lateralization begins</td>
</tr>
<tr>
<td>12-15 Months</td>
<td>Continues to improve with tongue lateralization</td>
<td>Feeds self with a pincer grasp</td>
</tr>
<tr>
<td>15-24 Months</td>
<td>Feeds self with fingers</td>
<td>Able to scoop food with spoon</td>
</tr>
<tr>
<td>18-24 Months</td>
<td>Drinks from cup independently</td>
<td>Chews completely with rotary chew</td>
</tr>
</tbody>
</table>

Infants and Feeding
A Positive Feeding Environment for Infants

Find a place in your home where you are comfortable. A chair or sofa with an armrest will help provide support. Infants will become familiar with this place and it can help them know it is time for a feeding.

Recommendations:

• Be quiet

• Limit distractions
  o Turn television off.
  o Music could be played softly, if it is soothing for your infant
    ▪ If playing music, volume should be low and soft
  o Wait until the feeding is done prior to making or answering phone calls

• Limit talking when feeding a newborn
  o If talking is necessary, use a calm, quiet voice

• Use soft lighting
  o Bright lights or direct sunlight may upset or distract your infant

• Make eye contact and smile with your infant

Positioning the Newborn or Young Infant for Feeding

- Be sure that you are comfortable when sitting to feed your baby. A chair or sofa with an armrest will help provide support.
- Keep your baby's head forward so his chin is toward his chest.
- You may need to wrap your infant snug in a blanket (swaddle) to support the arms and feet.
  - You can also support the feet against your leg or the side of the chair.
- Provide firm touch during position changes and burping.
- You need to hold your newborn's bottle.
  - Do not try and prop it with pillows or a blanket, as this can be unsafe for your baby.
- Your newborn can lay in a variety of positions:
  - on his back with his head slightly elevated
  - on his side
  - in a semi-supported position

Positioning the Older Infant For Feeding

Infants 6 months and older:

- Need to sit straight up and face forward
- Encourage your infant’s hips, shoulders and head to be centered while sitting
- Keep your baby’s head forward so his chin is toward his chest
- Provide support using a highchair or feeder seat
  - Use a towel roll, if needed, to keep your infant’s head and body centered in the chair: roll it up next to your infant’s head or shoulders/body to prevent him from leaning sideways
- Use a tray to support your infant’s arms
- Use a tray or footrest to support your infant’s feet
  - Some infants will push their feet against the adult feeder for extra support

Feeding Techniques for Your Infant Using the Bottle

- Find a place where you are comfortable feeding your infant.
- Touch the nipple to your infant’s lips and let the baby open his mouth.
- Hold the bottle. Do not place pillows or other objects around the bottle.
- Do not twist or turn the bottle while your infant is drinking.
- Provide support, if needed, by placing your finger under the jaw. Support may also be provided below and/or above the lips.
- Avoid wiping of the face, as this can be distracting.
- Make sure the nipple is flowing at the right speed for the infant.
  - There are nipples that flow slowly, while some flow faster.
  - Make sure your infant is able to swallow with the pace of the flow, and does not have to work too hard to drink from the bottle.

References: Fraker & Walbert (2003), Satter (1990)
Feeding Techniques for Your Infant Using a Spoon

• Sit at eye level with your child.

• Use a flat spoon with a shallow bowl.

• When offering baby foods:
  - Present the spoon slightly below your infant’s mouth.
  - Wait for your child to look at the spoon and open his mouth.
  - Touch the spoon gently to your child’s bottom lip.

• Provide support to the mouth or jaw by placing your finger under your infant’s chin or bottom lip, if needed.

• If the tongue is pushing the food out of the mouth:
  - Press down with the spoon on the center of the tongue (just past the tip).
  - Turn the spoon sideways when placing it in your child’s mouth.
  - Try presenting the spoon at the side of the mouth rather than at the center of the lips (lateral presentation).

• Avoid wiping your child’s face until the end of the feeding.

• Let the infant touch the food and feed himself with his fingers when he is ready.
  - Getting messy with food allows the infant to explore and learn about the foods he is eating.

References: Fraker & Walbert (2003), McCurtin (2008), Satter (1990)
Introducing Baby Foods

**Infant Cereal:**

Between 4 and 6 months of age, when your baby is able to maintain head control and sit with support, he will be ready to begin infant cereal.

- Add the infant cereal to breastmilk or formula.
- Begin with 1 Tablespoon.
- Increase to 2-4 Tablespoons as your baby is ready.

Introduce only one new cereal per week.

- Watch for sensitivities or allergies: redness around the mouth, ears, jaw, or stomach; swelling in the face, or difficulty breathing

**Stage 1 Baby Foods:**

Introduce only one new food and serve it for at least 3 days.

- Watch for sensitivities or allergies: redness around the mouth, ears, jaw, or stomach; swelling in the face, or difficulty breathing.

1st. Vegetables: Orange, Green
    - Carrots, Sweet Potatoes, Squash, etc.
    - Green Beans, Peas, Spinach, etc.

2nd. Fruits
    - Peaches, Pears, Bananas, Applesauce, etc.

**Stage 2 Baby Foods:**

These will be slightly thicker than what your infant is used to, so be patient as you begin to feed them.

Toddlers and Feeding
A Positive Feeding Environment for Toddlers

• Provide a consistent place for your child to sit at mealtimes.
• Have a quiet environment during meals.
• Limit distractions.
  o Turn the television off
  o Music can be played softly, if it is not distracting to your child
• Talk in a quiet manner.
• Do not allow your child to walk around the room while eating.
• Maintain a consistent schedule for meals and snacks.
  o 3 meals and 2-3 snacks a day
• Offer positive role models while eating.
  o Friend, brother or sister, or adult

Positioning Your Toddler for Feeding

- Toddlers need to be supported at mealtimes.
  - May use a highchair or booster seat.
  - Support arms with a tray or with the table.
  - Support feet with a footrest or stationary object.

- Maintain upright, forward position of head and neck.

- Sit eye level with your toddler at the table in order to model eating.

- When offering food, present it slightly below your toddler’s mouth at the center of the mouth (midline).

Feeding Tips for Toddlers

- You may need to prepare your child’s mouth and body before eating.
  - Strategies to alert your child may include: bouncing or a cold toy
  - Strategies to calm your child might include: gentle rocking or deep or firm touch around the mouth

- You may need to use an activity prior to coming to the table.
  - A familiar song, routine of washing hands, or having your child help to set the table will help them know that it is almost time to eat.

- Gradually increase your child’s interaction with foods.
- Let your child take the lead in learning about new foods.
- When offering foods, present the spoon slightly below your child’s mouth.
- Model eating and chewing for your child.
- Add calorie boosters to the foods your child likes, if needed.
- Offer appropriate serving sizes:
  - One tablespoon of food from each food group per year of age is considered one serving for that food group.
  - Start with a small portion and add more as your toddler accepts it.
- Offer small amounts of new foods along with familiar foods.
  - Offer at least 1 preferred food at every meal/snack.
- Use positive reinforcement. Offer praise for eating well!

Developing a Feeding Schedule for Your Toddler

• Have a consistent, predictable schedule for meals and snacks.
• Have a predictable routine before, during, and after eating.
• Offer your child 3 meals and 2-3 snacks a day.
  o Meals should last 20-30 minutes.
  o Snacks should last 10-15 minutes.
• Try to have 2 ½ - 3 hours between meals/snacks with no eating in between.
• Offer your child milk to drink only during meals or snacks.
  o Offer your child a drink of water if they are thirsty between meals or snacks.
• Place food & utensils where your child can see them.
• Use consistent people to feed your child.
• Make changes gradually.
• Offer new foods multiple times.
  o It takes 10-15 times before a child will decide if he likes a food, so keep trying!

Food Progression
Strategies to Progress the Texture of Food

It is important to progress the texture of foods and variety of foods for infants in their 1st year of life (Hanson, 2004). This will help your infant to be less likely to show food preferences.

Strategies to try for successful transitions to table food

• Start with foods that are familiar to the infant.

• Mix 3/4 baby food with 1/4 real food that has been blended with a food processor or blender.
  o Gradually increase the ratio as the infant tolerates the texture and taste of food.

• Increase the texture from smooth to lumpy:
  o Thicken baby food with wheat germ, potato flakes, or dehydrated fruits or vegetables.
  o Add in finely crushed crackers, pretzels, or vanilla wafer cookies into pureed food.
  o Gradually increase the amount added or particle size of the crushed food.

Make gradual changes with introducing changes of textures in foods.

Table Foods:
Smooth Purees and
Soft Mashed Foods

These are foods that you can purchase or prepare that do not require mashing, but are slightly thicker consistency than baby foods.

- Pudding
- Yogurt (no fruit pieces)
- Mashed potatoes
- Applesauce

You can use a fork to mash foods into a desired consistency. These foods might include:

- Avocado
- Bananas
- Canned Pears*
- Cooked sweet potatoes
- Cooked squash
- Canned yams*
- Canned carrots*
- Canned potatoes*

*Canned fruits and vegetables have been cooked and are stored in juice. They will be extremely soft for mashing.

Vegetables cooked in a crock pot are also soft and easy to mash.

Learn to Chew: Foods to Explore

It is important for your child's tongue to move easily within their mouth as they learn to eat table foods.

Use foods that your child can hold while they EXPLORE the taste and texture of foods. It is NOT intended for your child to eat these foods.

Encourage your child to put the food on their back, molar teeth and the tongue will begin to move to the sides of the mouth to touch the food.

Foods to try:

- Raw carrot sticks
- Jicama (a sweet-flavored vegetable)
- Celery sticks
- Baby pretzels
- Dutch pretzels
- Dried fruits
- Bagel strips
- Frozen pancakes
- Frozen waffles

If your child is older than 12 months, you can try:

- Licorice (leave the bag open for a day- stale licorice works well)
- Small suckers (Dum-Dum or Tootsie Pop)
- Beef Jerky

Learn to Chew:
Strategies and Tips to Try

Chewing is a skill that develops over time. It will take practice!

As the tongue begins to move from one side of the mouth to the other, chewing should improve.

*To Increase Chewing:*

- Model the skill. Show your child how to chew on the back teeth.
- Use a mirror so your child can watch himself chew.
- Have your child use a rhythmical biting and chewing pattern.
- Offer a toy designed for chewing prior to the meal. Encourage chewing on the sides of the mouth.
- Offer foods such as raw carrots, raw celery, beef jerky, licorice twists and sugar-free bubble gum to increase chewing skills.
- Use a thin, porous bag or cheesecloth:
  - Wrap bite size pieces of food and place on the molar surface of the child's mouth.
- Cut food in long strips or provide stick-shaped foods
  - Pretzels sticks or cheese puffs.
- Place food towards the side of the mouth between the cheek and gums.
- Provide opportunities for practice.

Remember: It is important to expose children to textured foods they will need to chew.

Foods so Good, 
They Will Melt in Your Mouth!

These are foods that dissolve with saliva only. Very little pressure, if any, is needed for your child to eat these foods.

Foods to try:

• Towne House crackers
• Gerber biter biscuits
• Nabisco graham crackers
• Thawing frozen pancakes
• Thawing frozen waffles
• Gerber’s cereal squares
• Fruit Loops cereal
• Fruity Pebbles cereal
• Captain Crunch cereal
• Baby cookies
• Cheetos Puffs
• Chocolates
• Pringles
• Popsicles/Frozen fruit bars

Single Texture Table Food

These are foods that break apart in the mouth very easily.

Foods to try:

- Fruit breads
- Muffins
- Soft small pastas
- Cubed lunch meats
- Thin deli meats in small rectangles
- Soft pasta soup without the broth
- Soft meat soup without the broth
- Soft pretzels

Check with your child's doctor prior to trying:

- Scrambled eggs

Moving on to
Mixed Textured Table Foods

Now it's time to begin to increase the texture of the foods your toddler is eating. Many foods offer mixed textures that your toddler will learn to like.

Foods to try:

- Macaroni & Cheese
- Soups
- Diced mixed fruit
- Cereal and milk
- Fruit pieces in Jello
- Tuna salad
- Egg salad
- Baked beans
- Spaghetti or lasagna
- Pizza
- Sand-which
- Tortilla rollup
- Yogurt with Fruit Pieces
- Meatloaf
- Casseroles

Finger Foods for Older Infants

Foods should be in bite size pieces, or cut long and narrow so the older infant can grasp the food, hold it and take a bite. When you give your child a strip of food, they are able to use one end of the food as a handle and there is still enough food sticking out of their hand for them to take a bite.

Foods to Try:

- **Carbohydrates/Grains**
  - Cookies
  - Dry cereals
  - Graham crackers
  - Crackers (Towne House, Ritz)
  - Soft bagel pieces
  - Egg noodles or pastas
  - French Toast sticks or strips; Pancakes

- **Fruits/Vegetables**
  - Bananas cut into small pieces
  - Canned pears or peaches
  - Cubed or slightly mashed cooked potatoes
  - Soft cooked, cubed vegetables: carrots, peas, sweet potatoes, yams

- **Proteins**
  - Soft cheeses
  - Chicken or beef (cooked); boiled eggs

Finger Foods for Toddlers

Foods should be in bite size pieces, or **cut long and narrow** so your toddler can grasp the food, hold it and take a bite. When you give your child a strip of food, they are able to use one end of the food as a handle and there is still enough food sticking out of their hand for them to take a bite.

**Foods to Try:**

- **Carbohydrates/Grains**
  - Cookies/crackers
    - Graham crackers, Towne House, Ritz, Arrowroot
  - Dry cereals
  - Soft toast
  - Soft bagel
  - Biscuits
  - Muffins
  - Egg noodles or pastas
  - French Toast sticks or strips
  - Pancakes cut into strips
  - Waffles cut into strips
• **Fruits**
  - Bananas cut into strips or sections
  - Cantaloupe
  - Watermelon
  - Blueberries
  - Mandarin oranges
  - Mango
  - Strawberries (cut in half)
  - Canned pears or peaches
  - Fresh fruit (peeled)

• **Vegetables**
  - Cubed or slightly mashed cooked potatoes
  - Soft cooked, cubed vegetables:
    - Carrots, peas, sweet potatoes, yams, asparagus tips, broccoli florets, cauliflower
  - French fries
  - Green beans
  - Peeled tomatoes

• **Proteins**
  - Soft cheeses (American or Mozzarella)
  - Chicken or beef (cooked); roasts
  - Lunchmeats, ham, hamburger pieces
  - Boiled eggs or deviled eggs
  - Dried beans (cooked)

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Finger Foods for Toddlers:  Page 2 of 2

Table Foods for Toddlers: Foods to Promote Self-Feeding With a Spoon

When helping your toddler learn to use a spoon, there are certain foods that will help him to succeed more easily. Thicker foods that stick easily to a spoon will help the child experience greater success.

Foods to Try:

- **Carbohydrates and Grains**
  - Oatmeal
  - Cream of Wheat
  - Macaroni & Cheese

- **Fruits and Vegetables**
  - Applesauce
  - Cooked squash/sweet potatoes that have been fork mashed
  - Mashed potatoes/ Potato Flakes

- **Proteins and Dairy**
  - Pudding
  - Yogurt
  - Cottage Cheese
  - Refried Beans

References: Morris & Klein (2000)
Calories and Serving Sizes
Increasing Calories for Weight Gain in Young Children

Children with feeding issues may have difficulty gaining weight because the stomach is small with limited space for food or because they become tired of eating before adequate nutrition is consumed.

Add to meats, vegetables, pasta, blended smoothies, etc.

- Butter, Margarine, or Oil: 45 cal per tsp.
- Wheat germ: 25 cal/Tbsp.
- Mayonnaise: 45 cal/tsp.
- Evaporated milk: 25 cal/Tbsp.
- Sweetened condensed milk: 60 cal/Tbsp.
- Gravy: approximately 40 cal/Tbsp.
- Dry milk powder: 25 cal/Tbsp.
- Ice Cream: 17 cal/Tbsp.
- Cream Cheese: 50 cal/Tbsp.
- Heavy Whipping Cream: 60 cal/Tbsp.
- Corn Syrup: 60 cal/Tbsp.
- Peanut Butter: 100 cal/Tbsp.
- Grated Parmesan cheese: 143 cal/1 oz.
- Natural maple syrup: 50 cal/Tbsp.
- Sour Cream
- Mashed Avocado: 194 cal per ½ cup
- Salad dressings

Recipes for Increasing Calories

**High Calorie Milk**

1 cup whole milk  
2 Tbsp. heavy whipping cream  
2 Tbsp. Dry milk powder

Mix well.  
Yields approximately 225 calories per 8 oz.

**High Calorie Pudding**

1 pkg instant pudding mix  
2 cups half and half cream

Mix with mixer, chill until set.  
Yields approximately 4 servings at 215 calories each.

**High Calorie Chocolate Pudding**

2 small packages chocolate instant pudding  
1 14-oz. can Sweetened Condensed milk  
1 large container regular Cool Whip

Prepare pudding per directions, mix additional ingredients with pudding, chill and serve.
Spice It Up!

Some children crave strong flavors and need more input in the mouth for eating.

Try changing one thing (temperature, texture, or taste) at a time about your child’s food.

Give your toddler the opportunity to dip their food in sauces to experiment with how much flavor they want added to their food.

Dip ideas:

- Ketchup or BBQ sauce
- Ranch salad dressing
- Honey mustard or other flavored mustards
- Cheese (Queso, melted Velveeta)
- Salsa (mild, medium, or hot)
- Taco sauce
- Pizza sauce or pizza squeeze
- Mayonnaise (Flavored or spiced)

These flavors are easily added to eggs, grilled cheese sandwiches, quesadillas, raw or cooked vegetables, chicken nuggets, fish sticks, hot dogs, corn dogs, pasta, and many other kid-friendly foods.

Food Temperature

- Try warming foods that are typically room temperature.
- Put foods in the refrigerator or freezer to find out if cold is preferred.
- Cold foods are often alerting and serve to “wake up” the mouth.
  - Ice Cream
  - Popsicles
  - Drinks with ice cubes

Spice It Up: Page 1 of 2
### Food Texture

**Crunchy:**  
Cookies  
Breadsticks  
Chips (Doritos, Fritos)  
Cheese puffs (Cheetos Puffs)  
Waffles  
Tator tots

Crackers  
Croutons  
Pretzels  
Dry cereal  
Fish sticks  
Taquitos

**Chewy:**  
PB & J (try toast, too)  
Chewy granola bars  
Taffy  
Gum drops

Breakfast bars  
Gummy candy  
Bubble gum  
Beef Jerky

### Food Taste

**Tart:**  
Lemons  
Yogurt  
Jelled Cranberries  
Sweet Tarts

Limes  
Cranberries  
Lime Sherbert  
Green apples

**Salty:**  
Pickles  
Chips  
Soy Sauce

Gravy  
Beef Jerky

**Spicy:**  
BBQ sauce  
Spaghetti Sauce  
Taco Sauce  
Vienna Sausage

Tomato Sauce  
Salsa  
Garlic  
Pizza squeeze

Spice It Up: Page 2 of 2  
Guidelines for Infants Through One Year: Breastmilk or Formula

<table>
<thead>
<tr>
<th>Age in Months</th>
<th>Amount per Feeding</th>
<th>Number of Feedings per Day</th>
<th>Average Total Volume per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 1 Month</td>
<td>2-5 ounces</td>
<td>8 -12 times a day</td>
<td>16-24 ounces</td>
</tr>
<tr>
<td>2-4 Months</td>
<td>5-8 ounces</td>
<td>4-7</td>
<td>20-38 ounces</td>
</tr>
<tr>
<td>4-6 Months</td>
<td>6-8 ounces</td>
<td>4-6</td>
<td>28-38 ounces</td>
</tr>
<tr>
<td>6-9 Months</td>
<td>6-8 ounces</td>
<td>4-6</td>
<td>24-32 ounces</td>
</tr>
<tr>
<td>9-12 Months</td>
<td>6-8 ounces</td>
<td>4-6</td>
<td>24-32 ounces</td>
</tr>
</tbody>
</table>

Serving Size:
What Should it Look Like?

• One tablespoon of food per year of age is considered a serving for each food group.

• Start with a smaller portion. This helps the child feel success after just a few bites.

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Child Age 1-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat, poultry, fish</td>
<td>1-2 Tbsp.</td>
</tr>
<tr>
<td>Eggs</td>
<td>¼ of egg</td>
</tr>
<tr>
<td>Cooked dried beans</td>
<td>1-2 Tbsp.</td>
</tr>
<tr>
<td>Pasta, rice, potatoes</td>
<td>1-2 Tbsp.</td>
</tr>
<tr>
<td>Bread</td>
<td>¼ slice</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1-2 Tbsp.</td>
</tr>
<tr>
<td>Fruit</td>
<td>1-2 Tbsp.</td>
</tr>
<tr>
<td>Milk</td>
<td>¼ - 1/3 cup</td>
</tr>
</tbody>
</table>

Toys to Promote Oral Motor Skills

When choosing toys for your infant, look for toys that are:

- **Easy for your child to hold and bring to his mouth**
  - Simple rings or links that are thin and lightweight will let your baby hold onto the toy easier.
  - You can start with one or two links, and add them together as your baby is able to hold them.

- **Multi-Textured and Multi-Sensory:**
  - Bumps, ridges, and lines on the toy will increase sensory input when your baby brings them to the mouth.
  - Look for toys that are interesting to look at.
  - Look for toys that make a soft noise when played with.

Brands can include: Sassy toys, The First Years

Encourage your baby to hold and chew on toys, and explore them with his mouth. As your baby explores the toys, he will be moving his tongue and developing skills that will help with chewing!
Cups, Spoons & Plates

CUPS

Introduce liquids in a small, plastic flexible medicine cup.

Use liquids that your child likes.
  - Thickened liquids that move out of the cup more slowly are easier for the child. Strained fruits or vegetables mixed with a small amount of liquid are a great place to start!

A small, soft spout cup is often easier for the child to seal his mouth around.

When your child is able, use a cup with a straw to help build oral motor skills.

As your child’s skills continue to improve and he begins to use a cup without a lid, a short, clear cup with a hard rim is suggested.

SPOONS

A young infant will benefit from using a rubber tip or soft plastic spoon. Give your child a spoon to play with and put into his own mouth while you are feeding.

When feeding, use a spoon with a small shallow bowl that fits easily into your child’s mouth.

Toddlers should use short spoons that are easy to grasp.

PLATES and BOWLS

Use a plate size that is appropriate for your toddler.

Some plates and bowls have a slight rim around the edge that will help your toddler have a surface to scoop food against when feeding.

You may need to place a nonslip surface under the plate for stability. (Dycem or Non-slip Shelf Liner)

References: Hanson (2004), Morris & Klein (2000)
Behavioral Techniques
Behavioral Techniques for the Young Child to Improve Feeding

Be positive and nurturing during mealtimes and snacks!

- Praise
- Positive Reinforcement

Allow the child to take the lead in learning about new foods. This can be very empowering for a child who has experienced little power in the mealtime routine.

- Allow the child to dish out portion sizes to each family member
- Give the child an opportunity to feed others at the dinner table

Encourage play with food!

- Have your child feed a doll
- Finger paint with pudding, applesauce, etc.
Make feeding fun!

- Find strong role models for peer modeling
  - Rotating bites of food between a sibling/friend and a child with feeding difficulties
- Token deposits
  - Providing a small reward (sticker, coin) for each positive step in the feeding process

Ignore negative behavior!

- Do not punish your child for not eating
- Do not coax or threaten your child to eat
- Do not try to distract your child’s attention away from eating.

Set a timer for meals and snacks.

- Do not prolong a feeding in hopes that your child will eat
- Explain to your child that they will wait until the next offering of food and not be allowed to eat until that time.

Continue to introduce a VARiEtY of foods!

Behavioral Techniques: Page 2 of 2

Resources
Additional Resources for
Parents and Caregivers

Books:

• Information on Newborn or Premature Babies:


• Strategies to Improve Eating New Foods:

  *Just Take a Bite* by Ernsperger & Stegen-Hanson (2004)
  A practical guide for parents and professionals providing strategies for the child with limited food choices.

  *Feed Me, I’m Yours* by Vicki Lansky (2004)
  Provides nutritious & fun foods to prepare for infants, toddlers, and preschoolers.

• Strategies to Improve Oral Motor Skills:

  Provides reproducible handouts of fun oral-motor toys for various age levels.

Other Resources:

• CDC Growth Chart: [www.cdc.gov/growthcharts](http://www.cdc.gov/growthcharts)
  Information on weight/height and age is provided
  Boys and Girls are on separate charts
Feeding Plan

Foods to Offer This Week

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Shopping List

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
References


CHAPTER V

SUMMARY

The purpose of this scholarly project was to design and create a manual to be used by occupational therapists to help educate and support families who have infants and young children with feeding issues. The manual, *Feeding Strategies for Infants and Young Children*, includes handouts that offer research-based strategies to promote advancement of feeding skills and assist with the progression of foods for infants and toddlers with feeding difficulties. The handouts were developed to be easy for occupational therapists to reference, while providing research-based strategies that can be implemented by families at home within a daily routine.

A limitation of this product is that its success is based on the implementation and consistency of the feeding strategies by the parent or caregiver. It is essential that there is a partnership between the parent or caregiver and the occupational therapist working with the child to improve feeding skills. Without a collaborative effort from the team members, the child with feeding difficulties may not progress along the feeding continuum. Frequently, families do not have established routines, which can impact the feeding process, or have been unknowingly reinforcing negative feeding behaviors. Other environmental barriers include families having a lack of resources to provide a variety of healthful food choices, thereby, limiting the
child's food experiences and repertoire. Parents may be unwilling or unprepared for the consistency and effort that is required to address the feeding skill deficits or difficult behaviors that their child demonstrates. An additional limitation of this product is that it has yet to be implemented by occupational therapists and families at this point in time. A gap in the literature was noted with regard to the various cultural differences with food progression and feeding practices. Further research is warranted in this area.

The implementation of this product would occur with training of the interdisciplinary team members involved. With Early ACCESS referrals, this usually involves a social worker or home intervention teacher as the service coordinator. This service coordinator typically would make the first contact, thereby, helping the family clarify and prioritize their needs. The service coordinator then would determine the disciplines (occupational therapy, physical therapy or speech therapy) that need to assess and evaluate the skills of the child based on the family's needs. Therefore, trainings regarding appropriate referrals for occupational therapy services are of great importance and would be provided to service coordinators, as well as additional team members to ensure understanding of the occupational therapist's role.

Use of this product will be piloted by occupational therapists providing Early ACCESS services. It would be beneficial to collect research data on the effectiveness of this product and its ease of use. This could be completed through a parent or
caregiver questionnaire or survey, determining the parent's understanding of recommended strategies, effectiveness of the interventions, and parent satisfaction with the overall feeding progress. A questionnaire or survey aimed at the usefulness of the manual for occupational therapists could also be developed for data collection. In addition, the Centers for Disease Control growth charts may be utilized by the occupational therapist to provide a measurement of the child's growth and weight gain. The PEACH Survey (Campbell & Kelsey, 2002) may be administered at the beginning of the treatment intervention and repeated at the annual review or discharge. With the PEACH Survey, if a decrease occurs in the numeric score following interventions, it is likely that an improvement would be seen in the nutrition and feeding skills of the child.

It is anticipated that this product will create increased opportunities for improving the caregiver's awareness surrounding the occupation of feeding. Mother-infant interactions will be enhanced and families will be supported with the education provided by this manual. Parents and caregivers will benefit from practical, research-based information that will promote the feeding skills of the child demonstrating difficulties. The information provided in the handouts is parent-friendly and easy to read. Useful information provided through handouts will promote a greater understanding of therapeutic strategies and recommendations to improve feeding skills. When coupled with a face-to-face visit, the information will provide an additional resource for the parent after the therapy session with the occupational therapist has ended. Implementation of this product
will ultimately result in improved feeding skills, growth, and development of the child.
References


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