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Describing and Assessing Feeding Disorders in Children with Autism

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DESCRIBING AND ASSESSING FEEDING DISORDERS IN CHILDREN WITH AUTISM

by

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TABLE OF CONTENTS

INTRODUCTION

Among the earliest accounts of autism spectrum disorder(ASD), descriptions of aberrant eating behaviors can be found by Leo Kanner written in 1943 (Kanner, 1985). However, as Lobato (2011) points out, feeding problems have received much less attention than the social, behavioral, and language problems associated with ASD. This neglect can be clearly seen in criteria for ASD in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). The criteria only includes impairments in socialization, communication, and restriction of behavior or interests. Moreover, the DSM-IV outlined criteria for Feeding Disorder of Infancy and Early Childhood (FDIEC) does not address many of the common feeding problems encountered with ASD (Seiverling, 2010). Despite the lack of diagnostic descriptors there is a growing body of literature establishing that feeding problems are very common in children with autism. (De Moor, 2007; Ledford, 2006; Lobato, 2011; Rojahn, 2010; Schreck, 2004; Seiverling, 2010; Twachtman-Reilly et al., 2008). The prevalence of feeding problems within the larger population of children with developmental disabilities has ranged from 13% to 80% (Schreck, 2004). Lobato's (2011), report estimates that 60%-89% of children with autism are selective eaters. Furthermore, Ledford and Gast (2006) found that between 46% and 89% of children with ASD are selective eaters or refuse to eat many or most foods with no known medical explanation.

Clearly feeding difficulties exist with children with ASD, but what specific behaviors and problems will families and clinicians encounter and why? Children with ASD who have feeding problems may engage in food refusal, food selectivity, and mealtime rituals (Twachtman-Reilly et al., 2008). These behaviors are brought about by any number of complex factors including physiological disorders, behaviorally based challenges, and weak executive functioning skills (Twachtman-Reilly et al., 2008). Due to the incredibility heterogeneous nature of the ASD population, assessing feeding can be very challenging. However, there are a number of formal and informal assessment tools available to professionals.

Lobato (2011) provides readers with a vivid case study of feeding problems children with autism often encounter. He outlines the story of Abigail, who began attending a multidisciplinary clinic at age three due to feeding problems and failure-to-thrive. She was reported to have been difficult to feed since infancy, when diagnosed with reflux. At age three, she was described as frequently having "meltdowns" at mealtimes and refusing to eat what the rest of family was eating.

> "Abigail acted as if her parents were poisoning her whenever they put something on or near her plate that she did not want to eat. Abigail's diet consisted solely of small amounts of toasted cheese sandwiches (white American cheese only), chicken nuggets

> (only one brand), and potato chips. She consumed no fruits or vegetables. She drank apple juice and a milk shake once per day" (p. 6).

Due to Abigail's feeding problems she was malnourished and a G-tube was being considered. She was in the third percentile for weight, 50th percentile for height, and had deficiencies in calcium, Vitamin D, and iron. Lastly, she presented with chronic constipation but would not accept high-fiber foods or laxatives (Lobato, 2011). As exemplified by Abigail, feeding problems for children with ASD can be a very complex and dangerous.

FOOD REFUSAL/SELECTIVITY

Unfortunately, Abigail is not an isolated case. Food refusal is common for children with ASD (De Moor, 2007; Lobato, 2011; Schreck 2004; and Twachtman-Reilly et al., 2008). De Moor defines food refusal as "the child orally refuses to accept all foods" (2006, p. 260). Food refusal is often maintained by positive reinforcement in the form of parental attention or negative reinforcement in the form of early meal termination (De Moor, 2007; Freeman, 1998).

Some children with ASD may also be highly selective in food choices to the point of diminishing quality of life for the individual or family. (Keen, 2008; Lobato, 2011; Seiverling, 2010; and Twachtman-Reilly et al., 2008). These children eat a very narrow range of food, often refusing entire food groups. In fact, Seiverling (2010) cites food selectivity as the most commonly reported and researched feeding problem in children with ASD. "Children may be selective by food type, temperature, texture, brand, and even color of food. Less commonly reported problems in those with ASD include liquid avoidance, packing, . . . and rapid eating" (Seiverling, 2010, p. 402). Highly selective diets such as these place children at a greater risk for specific nutritional deficiencies (often calcium, iron, fiber, and Vitamins C and D) as seen with Abigail (Lobato, 2011). This is not surprising as Lobato (2011) also reports that these children are "most often selective *against* fruits and

vegetables (58%-71%), meat or beans (24%-35%), and milk and dairy (18%)" (p. 6). Furthermore, selectivity does not always stop at food selection for some children with ASD. Some children will have specific utensil requirements or specific food presentation requirements (Schreck, 2004 and Twachtman-Reilly et al, 2008). Schreck (2004) provides the example of one child with ASD who only ate on a Thomas the Tank Engine plate and would allow no food to touch on his plate. He would also only eat at his picnic table. These behaviors make meal times very stressful for families with children who have ASD.

It can be difficult for families and clinicians to distinguish when feeding problems are simply willful defiance (a learned behavior) versus part of ASD symptomatology or part of another underlying medical condition. Twachtman-Reilly et al. (2008) states that behavioral "difficulties are not always behavioral (i.e., willful or volitional acts of noncompliance), but rather a reflection of the characteristics and symptoms of this multifaceted disorder" (p. 262). To complicate matters further, physiological issues can directly or indirectly lead to deficiencies in feeding skills/behaviors. One such physiological issue that can occur with ASD is deficiencies in sensory processing (Lobato, 2011; Twachtman-Reilly et al., 2008). Self reports that reactions to stimuli may cause children with ASD to be inattentive/distracted or become very

physically active (2010). Twachtman-Reilly et al. (2008), explain that children with ASD's responses' to stimuli may be hyperresponsive (overly sensitive) or hyporesponsive (under sensitive).

EFFECTS OF SENSORY PROCESSING PROBLEMS ON FEEDING

Furthermore, sensory processing problems can affect any or all sensory system: auditory, visual, gustatory, olfactory, tactile, vestibular, and proprioceptive. For example, when the auditory system is hyperresponsive the child is overly sensitive to sound during meals (Twachtman-Reilly et al., 2008). This can be especially problematic in public places that are often very noisy such as restaurants and school cafeterias. Children whose auditory system is hyperresponsive may exhibit symptoms of anxiety, aggression, crying, yelling, or appearing distracted (Twachtman-Reilly et al., 2008). On the other hand, if the child is hyporesponsive to auditory stimuli then he or she may be very unaware of verbal requests or sounds in the environment. In this case the child may appear to be daydreaming or 'spacey' (Twachtman-Reilly et al., 2008). If the visual sensory system is hyperresponsive, then the child may often shield eyes, squint, be withdrawn or anxious, or be distracted to the point that food intake is compromised. A visual system that is hyporesponsive may manifest itself in the child being overly focused on irrelevant visual features such as the food, plate, or be inattentive to the entire meal (Twachtman-Reilly et al., 2008).

Two sensory systems that directly impact feeding are the gustatory system (sense of taste) and olfactory (sense of smell) system. Perhaps the biggest determining factor of what food a child will consume is how

those foods taste to the child. When the gustatory system is hyperresponsive, then the child will prefer bland food, be a 'picky' eater, refuse food, and gag often. However, if the gustatory sensory system is hyporesponsive, then the child may crave very potent flavors such as very sour or spicy food and may lick or taste inedible objects (Twachtman-Reilly et al., 2008). Another factor that greatly impacts a child's impression of a given food is the smell of it; this is the responsibility of the olfactory sensory system. When this system is hyperresponsive, then children will often be picky eaters, distressed, withdrawn, and anxious. On the other hand, when this system is hyporesponsive, then children may be disinterested in eating and may require smell enhancement of foods (Twachtman-Reilly et al., 2008).

The remaining three sensory systems: tactile, vestibular, and proprioceptive also affect feeding behaviors although in a more indirect manner. The tactile system helps the body process textures and temperatures. When the system is hyperresponsive, children will often have a great dislike of messiness and prefer neutral temperatures. The hyperresponsive tactile system symptoms may result in food refusals (Twachtman-Reilly et al., 2008). In contrast, if the tactile sensory system is hyporesponsive then children may be completely unaware of messiness, may over-stuff their mouths with food, and mouth inedible foods (Twachtman-Reilly et al., 2008). The next system, the vestibular sensory system is responsible for processing where the body is in space. When it is hyperresponsive, children may have poor coordination using

utensils and be fearful in unsupported seats. On the other hand, if the vestibular system is hyporesponsive, then children may have poor posture and be fidgety during meals (Twachtman-Reilly et al., 2008). The last sensory system is the proprioceptive system, which is responsible for processing movement through space. If this system is hyperresponsive or hyporesponsive then children may be messy during meals, have poor gradation of jaw and hand to mouth movements (Twachtman-Reilly et al., 2008).

It is understandable that children with sensory problems may find feeding overwhelming if they are overly sensitive to one or more senses. On the other end of the spectrum, children may be hyporesponsive to one or more stimuli and appear unwilling to eat, when in reality they are not receiving adequate sensory input to engage in eating appropriately. In either case, problems that may seem to be 'behavioral' in nature are actually resulting from physiological sensory problems.

EFFECTS OF GASTROINTESTINAL DYSFUNCTION ON FEEDING

Another physiological domain that may underlie feeding problems is gastrointestinal (G.I.) dysfunction. Any number of G.I. problems can lead to feeding problems (De Moore, 2006). Twachtman-Reilly et al. (2008) mentions some of the common G.I. problems leading to feeding problems such as gastroesophageal reflux disease (GERD), constipation, diarrhea, and symptoms caused by food allergies. Twachtman-Reilly et al. go on to outline mixed reports in the literature about the prevalence of GI issues in children with ASD. It has been reported that as many as 23% of children with ASD also have GI problems and a poor appetite. It is unclear at this time if there is a correlation between ASD and GI issues. However, it is undisputed that for children who do have GI problems there is a greater risk for feeding problems, especially in children with ASD. It is not uncommon for children with ASD to be unable to adequately express discomfort or identify its source with GI problems (Twachtman-Reilly et al., 2008). This lack of communication leads to difficulty in receiving relief from symptoms. This in turn leads to some children refusing food in an attempt to avoid discomfort. Twachtman-Reilly et al. (2008) states that “All of these factors – physical discomfort, communication limitations, hunger, and so on – can cause a high level of frustration, which may be manifested in an undesirable behavior” (p. 264). Clinicians need to be aware of these physiological problems

that can lead to feeding problems, compound feeding problems, and lead to behavioral problems.

EFFECTS OF REPETITIVE AND RITUALISTIC BEHAVIORS ON FEEDING

Still, for some children behaviorally based problems lead to feeding problems. Repetitive and ritualistic behaviors, which are very commonly seen in children with ASD can lead to feeding problems (Lobato, 2011; Seiverling, 2010 and Twachtman-Reilly et al., 2008). For example, Seiverling (2010) points out that extreme food selectivity may be an extension of repetitive behavior patterns. Furthermore, according to Twachtman-Reilly et al., (2008) "the feeding rituals that children with ASD often demand extend to other aspects of mealtime, including insistence on specific methods of preparation, food types, and mealtime rules . . . " (p. 264); the presence of rituals at mealtime is more likely to be related to autistic symptomatology and its neurological bases than to behavioral noncompliance or purely developmental factors. There are many anecdotal reports of these repetitive feeding patterns and feeding rituals. Commonly reported behaviors include: insistence that all food presented on the plate be mono-colored, eating the same food for every meal, requiring that foods be presented in a certain order, or requiring that food not touch on a plate (Twachtman-Reilly et al., 2008). For most children with ASD, their personal repetitive and ritualistic behaviors not only seem odd to onlookers but are also highly ingrained and fixed behaviors making change difficult.

EFFECTS OF EXECUTIVE FUNCTION DIFFICULTY/FEAR ON FEEDING

Another neurologically based symptom of ASD that manifests itself behaviorally is executive function difficulty. There are four main areas of executive function that are typically impaired in children with ASD that negatively affect feeding: planning, mental flexibility, fear/anxiety, and atypical social and language skills (Hill, 2004; Twachtman-Reilly et al., 2008). The first skill, after planning is defined by Hill as "a complex, dynamic operation in which a sequence of planned actions must be constantly monitored, re-evaluated and updated" (Hill, 2004, p. 26). The ability to sequence and self-monitor are very important for mealtime behaviors. Twachtman-Reilly et al. (2008) points out that complex sequences are needed to successfully perform the following tasks: washing hands, obtaining utensils, consuming several foods, coordinating drinking and eating, and cleaning up following the meal. Moreover, lacking the ability to plan and sequence reduces the predictably of mealtime. Reducing predictably increases anxiety and stress in the child with ASD. Thus a child with poor planning skills may insist on eating the same foods in a highly ritualistic manner in an attempt to increase the predictability of mealtime (Twachtman-Reilly et al., 2008). This highlights the importance of increasing predictability when implementing treatment plans with this population. The next executive function skill often impacted by ASD is mental flexibility. Hill

(2004) states these impairments are indicated by “perseverative, stereotyped behavior [sic] and difficulties in the regulation and modulation of motor acts” (p. 26). It is clear that lack of mental flexibility is reflected in many of the ritualistic feeding behaviors previously described. Twachtman-Reilly et al. (2008) reiterates that lack of mental flexibility can be seen as a child's insistence on using a specific cup or eating utensil. The child may also insist on a specific method of food preparation or type of food. This executive skill serves as a good point for intervention for feeding and communication problems for children with ASD.

Another factor that may impact feeding behaviors in children with ASD is fear/anxiety. Fear is a known contributor of many pediatric swallowing and feeding difficulties (Twachtman-Reilly et al., 2008). This is particularly true in children who have a complex medical history. Even after the physical issues have been resolved, latent fear may manifest itself in resistance to new foods or oral feeding (Twachtman-Reilly et al., 2008). Furthermore, Twachtman-Reilly et al. (2008) explains the fear responses of children with ASD can be very difficult to decipher. While the responses are intensely expressed they tend to appear unrelated to the dangers of choking or vomiting. Twachtman-Reilly et al. (2008, p.265) cites one example from the perspective of a parent,

> Suddenly and mysteriously he had developed another phobia. He wouldn't drink water and seemed to believe that thirst could be quenched only by juice, milk or cola . . . A new ritual had developed . . . as soon as he got in the car . . . he immediately started negotiating beverages for the entire week.

These fears experienced by some children with ASD can be very hard to overcome. The one way for children to overcome these fears and anxieties is to experience that which brings about the fear. This situation will bring about a strong response in the child trying to escape the situation and the fear. Strong emotional responses and behavioral problems make overcoming these fears very stressful for the child and his or her family.

The remaining key executive skills that may affect feeding in children with ASD are social and language skills, which are intricately interdependent. The development of one skill set directly impacts the other skill set and vice versa. Moreover, these skills can also be directly involved in the development and/or exacerbation of feeding problems (Seiverling, 2010). Mealtimes in public schools and day care centers usually occur in a social context. There are unwritten social rules that mediate how the sequences of mealtime behaviors should occur. This social foundation for meals puts children with ASD at a disadvantage because these children often struggle to understand social rules (Twachtman-Reilly et al., 2008).

Twachtman-Reilly et al. (2008), goes on to explain that the social demands of the mealtime environment may lead to increased stress, which in turn, can lead to reduced appetite and increased food refusal. For example, if clinicians and teachers place additional social demands on children with ASD, such as engaging in conversation, this may complicate and compromise mealtime success. Some children with ASD have increased feeding problems due solely to language comprehension challenges. Twachtman-Reilly et al. (2008) highlight an example about a boy who refused to eat Thai food because "he thought that it was made of neckties. In this case, the individual's difficulty with understanding multiple meanings of words likely caused him to refuse to eat a particular type of food" (p.265). Therefore, challenges with either or a combination of communication and social skills can negatively impact feeding behaviors in children with ASD.

Children with ASD who have feeding problems may engage in food refusal, food selectivity, and mealtime rituals. These behaviors are brought about by any combination of complex factors including, physiological disorders, behaviorally based challenges, and weak executive function skills. The complex mix of factors contributing to feeding problems in children with ASD makes assessing and treating feeding problems with this population challenging. This problem is exacerbated by the fact that no two children have the same internal

and external factors contributing to feeding problems. Every child is unique, meaning that clinicians must be vigilant to examine each client's individual profile of contributing factors and symptoms. Future research is needed to find ways of identifying contributing factors and symptoms at earlier ages so that intervention can begin sooner. Adequate nutrition is important at all stages of life, especially for the child with ASD. The sooner developing feeding problems can be addressed the more effective overall treatment of ASD will be, because these children will have a stable physical condition and a solid nutritional bases to build upon.

MULTIDISCIPLINARY TEAMS

One necessary element in assessing feeding for the ASD population is the use of a multidisciplinary team. For example, doctors and nurses can be valuable resources for understanding the aforementioned prescriptions a client may be taking. Lobato (2011) highlights key team members such as physicians, dietitians, SLPs, occupational therapist (OT), and behavior analyst therapist (BAT). Physicians help assess not only the effects of medications, but also any contributing medical conditions. Dietitians are invaluable in assessing nutritional intake and needs for clients. OTs primarily assess fine motor and self-feeding skills. BATs bring expertise in assessing child and family eating and mealtime behaviors. Lastly, SLPs assess oral motor skills and swallowing. Each specialist has their own piece of the diagnostic picture to bring to the team. It is only when professionals work as a team that the whole picture can be assembled and a clear diagnostic understanding gained. This is especially true of children with ASD due to the complexity and variability of the disorder and its comorbidity with other medical conditions.

Another important participant in the assessment process is the clients' parents or guardians. They are an invaluable source of information to feeding therapist. In fact, a substantial part of the assessment will be completed through questionnaires completed by

parents and guardians of children with ASD. Many of these questionnaires are standardized, meaning that they are based on a body of normative data. For a feeding assessment these questionnaires are used to gather information about the presence of feeding problems and the variables maintaining the problems (Seiverling, 2010). Standardized questionnaires can be completed quickly in any setting and do not require any special training to administer. These factors make these questionnaires very popular tools for assessing feeding. Moreover, the results they yield can provide a springboard for possible intervention paths. Unfortunately, the accuracy of these questionnaires can be questionable. Furthermore, questionnaires can only provide correlational data which cannot be used to determine if a particular variable is responsible for the feeding problem. (Seiverling, 2010). For these reasons standardized tests should never be used in isolation for feeding assessments. Even so, they are valuable assessment tools and clinicians have a number of questionnaires at their disposal for feeding assessments.

The first such tool, The Screening Tool of Feeding Problems (STEP) is useful for assessing overall eating and mealtime behaviors. Twachtman-Reilly et al. (2008), states this assessment was designed specifically for individuals with intellectual disabilities (I.D.). It is for this reason that it may be appropriate for children with ASD since I.D. is often comorbid with ASD. (Seiverling, 2010;

Twachtman-Reilly et al., 2008). The STEP is a 23 item, scaled test based on research-identified feeding problems (Seiverling, 2010,; Twachtman-Reilly et al., 2008). Seiverling (2010) goes on to further explain the content of test. Five general categories are assessed: aspiration, selectivity, feeding skills, food refusal, and nutrition related problems. Items on aspiration examine topics such as vomiting and regurgitation of ingested food. The category of food selectivity examines patterns of food type, texture, temperature, feeder, and meal settings. Items on feeding skills measure swallowing ability, chewing ability, feeding independence, and the need of adaptive equipment. The category of food refusal examine mealtime refusal or termination (spitting out food), self-injury during meals, and aggression associated with meals. Lastly, test items on nutrition-related problems examine over and under eating, pica, and food stealing (Twachtman-Reilly et al., 2008). Furthermore, Twachtman-Reilly et al. (2008) and Seiverling (2010) both note that this assessment includes items that can be used to identify behaviors that increase risk of aspiration, which is of special interest to SLPs.

The next commonly used assessment tool is the Children's Eating Behavior Inventory (CEBI), which is based on caregivers' report and evaluates mealtime and eating behaviors. It measures the frequency of 19 different eating behaviors on a 5-point scale. The CEBI also has caregivers evaluate whether or not a given behavior results in a

problem for their family (Schreck, 2004). Siverling (2010) provides a detailed breakdown of the CEBI. It is composed of 28 items on food preference, motor skills, and behavioral compliance of the child. The test also includes 12 items that address parent behavior and family systems. Overall, it evaluates the frequency of 40 mealtime and eating behaviors. Siverling (2010) goes on to explain that "the CEBI was developed to measure the possible contribution of the child, parent, and family factors to eating/mealtime problems. It can be used for children from a broad age span with a variety of developmental and medical conditions" (p. 402). The wide breadth of this assessment, some would argue, makes it an ideal tool for children with ASD.

However, others argue that "measures such as the CEBI and STEP did not include items that address the feeding problems seen in children with ASD, such as mealtime self-injury, aggression, rituals, and food selectivity, and that previous measures have not adequately addressed mealtime behavior of young children (Seiverling, 2010, p. 404). The Brief Autism Mealtime Inventory (BAMBI) has the advantage of being the first standardized measure developed for mealtime behavior specific to the ASD population. Seiverling (2010) reports that it was also developed empirically and has strong psychometric properties. However, it has not been independently validated. The test is composed of 18 items that parents rate on a 5-point Likert

scale (Seiverling, 2010). This makes the test ideal when there is little time for assessment.

Another assessment commonly used to assess children with ASD is the Parent Mealtime Action Scale (PMAS). Seiverling (2010) reports that it was developed to identify both child and parent mealtime behavior and the frequency that the parents eat and serve certain foods. The test is considerably longer than the BAMBI as it contains 31 items with 9 subscales. Seiverling (2010) goes on to explain that the subscales include: "snack limits, positive persuasion, daily fruits/vegetables availability, use of rewards, insistence on eating, snack modeling, special meals, fat reduction, and many food choices" (p. 405). Items are scored on a 3-point Likert scale. The advantages according to Seiverling include the fact that the test was normed on a large sample, 2,988 parents, who had children aged 2 to 12 years old. Also, the assessment fits well into the early intervention model because it assesses what changes at the parental level might be effective. (Seiverling, 2010). By assessing parent behavior we can better prepare goals for parental interventions. Seiverling (2010) states that "By comparing the correlates of parent behavior and the child feeding problems, clinicians are provided with helpful information regarding what parent behavior may be contributing to the child's feeding problem as well as what changes parents can make in order to help make changes in child mealtime behavior"(p. 406). This

is important because it is often easier to make changes to the parent's behavior than it is to the child's behavior. It is this more global perspective that sets the PMAS apart from other assessments.

Another assessment tool available to clinicians is the Food Preference Inventory. Schreck (2004) and Seiverling (2010) both advocate the use of this tool. The inventory lists foods from each of the five food groups. Caregivers simply indicate if the child will consume an age appropriate amount of a given food. Caregivers also indicate if a given food is usually offered at meals and if it is consumed by the family. In this manner the level of variability in the child's diet can be evaluated relative to the level of variability in the caregiver's diet (Schreck, 2004; Seiverling, 2010). The Food Preference Inventory can be used to assess patterns of eating and refusing foods. Furthermore, The Food Preference Inventory can be used to help select the best foods to target in therapy. By selecting foods consumed by the caregivers and the not the child, clinicians can ensure that therapy targets will be reinforced at home. Thus, overall generalization and maintenance is much more likely. These factors taken together make The Food Preference Inventory a very important, dynamic assessment tool for clinicians.

Another key area that must be assessed when working with children with ASD is the domain of sensory processing. As mentioned earlier, children with ASD often have sensory processing difficulties leading them to be either hypersensitive or hyposensitive for one or more kind of sensory input. It is important that clinicians explore, what if any, sensory factors may be contributing to feeding problems. Moreover, sensory factors will likely present additional challenges to therapy. A formalized assessment can be conducted by an OT who specializes in sensory processing disorders (Twachtman-Reilly et al., 2008). The Sensory Profile is a standardized tool developed to help clinicians identify sensory processing difficulties that are directly or indirectly impacting feeding. This questionnaire includes a section for oral sensory processing as well as other areas that would affect feeding (Twachtman-Reilly et al., 2008). In addition, to using The Sensory Profile, clinicians should use structured clinical observations to assess sensory factors in the environment that may influence feeding performance. In order to ensure the observations are structured and focused a format has been developed by Miller, Wilbarger, Stackhouse, and Trunnell (2002) to guide clinical reasoning. The format's name

> "is derived from the observational categories of *s*ensory, *t*ask, *e*nvironment, *p*redictability, *s*elf-monitoring, and *i*nteraction (STEP-SI). This observational analysis is used not only to

> document how the child applies skills to various environments and maintains them, but also to ensure that the clinician is continually aware of the many sensory factors that can influence performance" (Twachtman-Reilly et al., 2008, p. 267).

When assessing sensory processing in children with ASD, it is important for clinicians to use valid standardized tools and to work closely with team members as sensory difficulties interact with feeding difficulties in complex ways.

Overall, standardized assessment tools are very important for clinicians assessing feeding problems within the ASD population. Tools clinicians should familiar themselves with include: The Screening Tool of Feeding Problems, The Children's Eating Behavior Inventory, The Brief Autism Mealtime Behavior Inventory, The Parent Mealtime Action Scale, The Food Preference Inventory, and The Sensory Profile. Each assessment tool has its own unique focus, strengths, and weaknesses. Above a brief overview of each assessment tool has been provided, but the best way for clinicians to understand these tools is to experience them first hand. Then clinicians will be able to evaluate when each tool is appropriate for their clients.

CONCLUSION

Children with ASD who have feeding problems may engage in food refusal, food selectivity, and mealtime rituals. These behaviors are brought about by any combination of complex factors including, physiological disorders, behaviorally based challenges, and weak executive function skills. In order for assessment to be individually tailored professionals must be able to utilize a wide variety of formal and informal assessment tools. For children with ASD who have feeding difficulties, the road to successful treatment can be long and difficult. Professionals must work to together and be willing use a wide variety of assessment tools to gain a holistic picture of each individual child with ASD and feeding problems. It is only after a holistic perspective is gained through collaborative assessment that a effective treatment plan can be created and implemented.

Moreover, since feeding problems occur frequently with children who have ASD further research is needed. Better diagnostic tools need to be developed to help distinguish feeding problems that are rooted in ASD verse feeding problems stemming from other sources. Furthermore, the link between early feeding problems (age two and under) needs to be explored. It has been established that early feeding problems are often reported (Bolton, 2012). Keen (2008) points out that the first stage of eating is comprised of learning to regulate self, suck, swallow as well as time of onset and termination

through the use of social signals. When an infant does not master these skills feeding problems occur often resulting in failure-to-thrive (Keen, 2008). Keen (2008), goes on to explain that since autism has a established link to with sensory processing abnormalities, biological factors affecting self-regulation may be of particular importance. Further research may reveal that early feeding problems are accurate predictors of autism in children under the age of two. This is important because autism is usually not diagnosed before age three or older. If precise diagnostic tools could be developed for this purpose then earlier diagnosis could be made and treatment specific to autism could begin earlier.

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