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Parent Educational Manual: Using Sensory Integration Techniques for Children with Autism

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Parent Educational Manual: Using Sensory Integration Techniques for Children with
Autism

By

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Approval Page

This Scholarly Project Paper, submitted by Stephanie Bekken and Lacey Lemley 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.

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CHAPTER I

INTRODUCTION

Parents are challenged everyday when caring for their children. Now imagine a child who refuses to play with other children, becomes irritated by the slightest sound, and appears to have no affection for others. These examples are behaviors that parents might cope with during a typical day when caring for a child with autism.

The concept of autism dates back to 1943 when Leo Kanner and Hans Asperger first described case stories about the theoretical explanations to what is recognized today under the general term “autistic spectrum disorders”. The word “autistic” was first introduced by Eugen Bleuler, a psychiatrist in the twentieth century. His descriptions of autism were that of narrowing of relationships to others except oneself. Consequently, the Greek word *autos* meaning “self” was formulated into the term autism. (Frith, 2003, p. 5)

According to the National Institute of Child Health and Human Development (2004), approximately 1/500 cases to 1/1,000 cases of autism are diagnosed every year. This is a significant difference when compared to a 1966 study in which Victor Lotter found a prevalence of 4.5/10,000 of the population with having autism. The question is whether or not there is indeed an increase in the prevalence of autism or if current research on autism has made improvements when looking at reclassifications of diagnoses. Because more cases of autism are being detected, it is imperative that education on the effectiveness of various treatment/interventions be reviewed.

Research indicates that children diagnosed with autism have difficulty performing daily occupations and functional tasks. Based on current literature, it is evident that parents are seeking information regarding the behaviors associated with autism, as well as learning strategies to promote a more functional lifestyle for their child. Therefore, an educational manual providing explanation to various behaviors and treatment techniques, associated with autism, will be provided for parents in order to gain an understanding of this disorder.

A term that goes hand-in-hand with treatment intervention for children with autism is sensory integration. In a “typically” developing individual, the brain is able to organize and process information obtained from the senses including: touch, movement, hearing, and seeing. In a child diagnosed with autism, research has indicated a deficit in sensory functioning, thus affecting how the child behaves and interacts with others and their environment.

Based upon these findings, this educational manual will include a summary of findings from current literature available on autism and the use of sensory integration as a treatment method. There will also be an introductory section with an overview of what behaviors/characteristics are seen as a result of this dysfunction. The primary portion of the manual will contain treatment interventions that may serve as a guideline for parents with an autistic child.

It is the authors’ hope that through this educational manual, parents of children diagnosed with autism will increase their knowledge about this disorder and the use of sensory integration intervention strategies.

CHAPTER II

REVIEW OF LITERATURE

In order to develop a manual for parents of children with autism related to sensory integration intervention, it is necessary to review the current literature on the topic. The purpose of this chapter is to provide the reader with a better understanding of autism and treatment through the use of sensory integration. The chapter is organized to first provide information pertaining to the definition of autism and the characteristics of this disorder. The second section of the literature review gives an overview of sensory integration theory and its basic functions in the human body. The third section focuses on the process of sensory integration. The fourth section describes the three primary systems: tactile, vestibular, and proprioceptive, and how they relate to children with autism. The fifth section focuses on current literature that relates sensory integration treatment techniques for autistic children. The sixth section describes the importance of occupational therapy and sensory integration treatment for children with autism. The final section of the literature review gives examples, from current literature, relating to parental issues of raising a child with autism.

Definition of Autism

Autistic Disorder, also referred to as childhood autism, is an impairment of social interaction and communication as well as presence of stereotypic patterns of behavior. The diagnosis of autism is usually made prior to age 3, although research has indicated some parents are reporting symptoms at early infancy (American Psychiatric Association,

2000). In a study by Young, Brewer & Pattison (2003), poor eye contact and lack of interest in toys starting at nine months of age were the earliest behaviors noted in infants.

According to Frith (2003), common characteristics of autism include impairments in verbal and nonverbal communication, the lack of ability to socialize with others in an appropriate manner, and repetitive/eccentric behaviors. Sensory processing involves receiving and translating a physical stimulus. These processes together allow for optimal learning, performing actions, and perceiving information from the external environment (Ahn, Miller, Milberger & McIntosh, 2004). Ayres (1979) and Waitling, Deitz & White (2000) indicate a correlation between autism and deficits associated with sensory processing.

According to Ayres (1979):

There are three aspects of poor sensory processing that we see in autistic children. One, sensory input is not being “registered” correctly in the child’s brain, and so he pays very little attention to most things, while at other times he overreacts. Two, he may not modulate sensory input well, especially vestibular and tactile sensations, and so he may be gravitationally insecure or tactiley defensive. Three, the part of his brain that makes him want to do things, especially new or different things, is not operating normally, and so the child has little or no interest in doing things that are purposeful or constructive. (p. 124)

In their research study, Waitling et al. (2000), note that “67.5% of the children with autism displayed more frequent sensory behaviors as compared to children without autism” (p. 419). This indicates deficits in one’s ability to process sensory information. The characteristics present in those suffering from autism are indicative of a sensory dysfunction. Sensory Integration Dysfunction is the “inability to process information received through the senses” (Kranowitz, 1998, p. 8).

What is Sensory Integration?

A. Jean Ayres, an occupational therapist, was the first to develop the sensory integration theory which emphasizes the relationship between sensory processing and its effect on motor and behavioral performance. Ayres (1979), states “sensory integration is the organization of sensation for use. Our senses give us information about the physical conditions of our body and the environment around us” (p. 5). Similarly, Lane (2002) addresses sensory integration as the process involved in combining sensations between or within sensory systems. From this theory, specific techniques have been developed to treat a variety of sensory dysfunctions, including those seen in autism. These techniques are known as sensory integration (SI) treatments. Spitzer and Roley (2001) note the importance of performing adaptive and organized responses and how this can be achieved through various interventions focusing on the child’s sensory needs. This concept is applicable to a variety of disabilities, especially for treatment intervention with a diagnosis of autism.

Ayres (1979) states that sensory integration occurs within central nervous system, which consists of the spinal cord and the brain. The central nervous system plays a crucial role in the human body by integrating the senses. In addition, Ayres notes that “over 80 percent of the nervous system is involved in processing and organizing sensory” (p. 28). In a normal functioning brain, sensory information is processed and responded to in an organized manner and an individual's behavior patterns and interactions with others are functioning at a normal level. On the other hand, a child with autism has difficulty processing and responding to information from the sensory

Receptors; therefore behaving in an inappropriate manner. This then leads to deficits in the child's everyday activities (Ayres, 1979; Frith, 2003; Mulligan, 2002).

How does sensory integration occur?

According to Williamson and Anzalone (1996), in Yack, Sutton & Aquilla (1998), there are five components in understanding the process of sensory integration: registration, orientation, interpretation, organization, and adaptation.

Registration of Sensory Stimuli

Registration of sensory stimuli is a process that sorts and categorizes input for performance in everyday activities. In fact, we may not even be aware of this happening as it is an automatic process that occurs within the brain in which detection of sensations take place. However, in children with autism there is a deficit in their ability to process sensory stimuli within the environment. There is a continuum in which this deficit lies, whether it be hyper or hypo-sensitivity or both in some cases (Yack et al., 1998).

Kranowitz (1998) defines Hyper as a Greek word for "over". Children who experience hypersensitivity are registering sensations at an intense level. According to Trott, Laurel & Windeck (1993), hypersensitivity is often seen in children with autism as evidenced by characteristics such as distraction, irritability, or demonstrating behaviors such as lashing out. For example, a child with autism may become extremely agitated by the lightest touch or sound. As a result of hypersensitivity, a child with autism may not be able participate in age appropriate child activities.

Kranowitz (1998) also states that hypo is a Greek word for "under". A child who experiences hyposensitivity is registering sensations at a level that is considered below normal. Safety issues are of concern for children with hyposensitivity because they do not perceive situations as painful (i.e. hot/cold, sharp materials). A higher amount of stimulation is required in children with autism to increase their arousal. Self stimulation and sensory seeking behaviors such as consistently touching others/objects, running into walls and desks, or withdrawing from others are commonly seen in children with a hyposensitivity to stimuli (Yack et al., 1998).

Ingersoll, Schreibman & Train (2003), completed a study identifying the effects of sensory feedback on object imitation in children with autism. Their findings are congruent with the theory behind hyposensitivity indicating that the children within this study did in fact seek sensory stimulation through toys presented to them. They were also responsive to the various auditory and visual stimuli presented.

Children with autism may also have a combination of both hyper and hyposensitivity (Trott et al., 1993; Yack et al., 1998). Various interventions in regards to sensory processing deficits will be addressed later in the literature review in the subsection titled intervention strategies.

Orientation to Sensory Stimuli

The second component identified by Williamson and Anzalone (1996), in Yack, et al. (1998) consists of orientation to sensory stimuli. Orientation to sensory stimuli allows individuals to pay attention and to be aware of new sensory information from the

environment. Integral to this component, is the manner in which a person organizes sensory stimuli and determines what is relevant for optimal performance in daily activities. This concept is known as modulating one's senses (Frith, 2003; Yack et al., 1998). Reeves (2001) states that modulation is "the process by which incoming neuronal signals are adjusted in intensity to ensure internal order" (p. 90). Frith (2003) reports that in a normal cognitive system, there is a sense of coherence that allows individuals to generalize information. Based on this idea, it is evident that children with autism are experiencing a detachment from their thought processes either from a lack or resistance to coherence.

In an effort to analyze coherence, Booth, Charlton, Hughes & Happe (2003) conducted a study using drawing tasks. Each child was shown a picture of four different stimuli (snowman, clock, house, and ship) and was then instructed to draw two types of pictures; one using a model and the other without. Scoring criteria were grouped into three different categories. The category of "initial features" addressed the local and global elements of the drawing. Local elements are defined as the details of a picture, whereas global elements are the outline. The second category "fragmentation" addressed the overall appearance and separation of parts within the drawings. The third category "configural violation" dealt with object placement and the overall shape of the disorder (ADHD) and "typically" developing children, the children with autism demonstrated a significantly higher percentage of weak coherence in all three of the

categories. It was noted that 80% of the children with autism showed some lack of planning when comparing the scores on the configural violation. However, impairments of planning did not account for the detail focus in the children with autism. Findings from the drawing task indicate that weak coherence in children with autism is not necessarily associated with executive function, but are related more to cognitive choice and style. This is based on factors from both the ADHD and the “typically developing” group, in which both groups had less detail in their drawings. As ADHD is often associated with deficits in executive functioning, it appears that coherence factors are not a direct result of a cognitive deficit.

Interpretation of Sensory Stimuli

Interpretation and discrimination of sensory stimuli are an important part of the sensory process. Yack et al. (1998) describe sensory interpretation as the process of understanding and recognizing stimuli using senses such as hearing or vision. Interpreting these senses to detect changes within one's environment is necessary for registration and orientation to occur. When an individual's sensations are impaired, as with autism, it is difficult to regulate arousal to various stimuli within the environment.

Koomer & Bundy (2002) state that children with autism either have a heightened or lowered arousal to stimuli, which ultimately affects their impulse control. Arousal factors that can be seen among the autistic population include behaviors associated with sensory seeking and defensiveness, which will be described in detail in the sub-section on the various sensory systems.

Organization of a Response

Organizing a response is necessary for completion of everyday tasks. It is imperative that physical, emotional, and cognitive components are functioning appropriately in order for an individual to respond to stimuli (Yack et al., 1998). In a child with autism, these responses are not carried out in an appropriate manner due to under or over responsiveness of stimuli within the environment (Koomer & Bundy, 2002; Tupper & Klosterman Meisner, 1995). In some cases, children with autism interpret sensory input as negative, thus resulting in a “fright, flight, or fight response” (Trott et al., 1993).

During interpretation of sensations, children with autism may experience defensive behaviors to sensory stimuli as a result of under or over responsiveness. This may result in behaviors such as hitting someone, yelling, running away, or being scared of objects. Parental guidance is an important factor as children with autism demonstrate poor judgment and may not recognize potential hazards within their environment (Trott et al., 1993).

Even though parenting is an important role, there may be situations in which the child with autism may need to learn self-regulation of behaviors. For example, when a child is in the school environment playing with peers (Anderson, 1998). Biebrich and Morgan (2004) further researched the use of self-regulation and affective expression during play in children with autism as compared to those with Down syndrome. Their findings indicate children with autism showed greater deficits in attention, flexibility, engagement,

and goal-direction during play tasks. Therefore, it is important to teach strategies to enable children with this disorder to self regulate behaviors.

Anderson (1998) concludes that this can be accomplished through identifying and using sensory integration techniques for modification of behaviors. Teaching self-regulation in children with autism begins with adult observation, experimentation, and direction with various sensory motor input. Once the child has been taught how to choose the appropriate input, initiation and generalization can occur within a variety of settings. Anderson (1998) further describes adult supervision and direction with the following:

After observing a five-year-old child regularly chew on objects, sometimes destroying class materials, his teacher provided oral motor activities. A necklace of baby chewy beads helped but was not enough to solve the problem. The child seemed in distress, so attempts were made to provide a calming environment. The teacher used a room divider to minimize visual distractions and provided an inflated seat for the child to use during work stations to expend excess energy. (pp. 24-25)

Adult direction to a child may include introducing strategies and implementing them.

Within this component is the importance of having a child choose a specific strategy. For example, Anderson (1998) states:

A lethargic or drowsy older child doing desk work can be directed to choose a piece of gum or a cup of water. Lower functioning children may not have self-awareness of their need but can still be taught to choose when directed. (p. 25)

Initiation of activities, which is important for generalization of skills, is illustrated through the following:

An 8-year-old boy needs to “unwind” at home after a day of structure and learning. He chooses from activities his parents can observe him doing safely (roller skates, a swing, or jumping) that he uses for as long as he needs, without structure. (p. 25)

Through consistent use of these techniques, it is hypothesized that children with autism will demonstrate typical behaviors, thus leading to a more a more organized and generalized response to environmental stimuli (Anderson, 1998).

Adaptive Response

Adaptive response is the last component in the sensory integration process as identified by Williamson and Anzalone (1996), in Yack et al. (1998). Current literature (Ayres, 1979; Frith, 2003) has indicated that children with autism are resistant to change within their environment. Bieberich and Morgan (2004) reported that children with autism have deficits in their ability to adapt, attend, and orient. As a result, children with autism are more likely to engage in behaviors that are routine because a certain response is known. Based on a recent study by Frith (2003), it was concluded that children with autism exhibited rigid and stereotypic behaviors, as noted by their restriction to using only one or two colors on a craft project. Maintaining rigid standards to routines is thought to relate to a lack in spontaneous behavior, a common characteristic seen in this population.

In a study completed by Gilotty, Kenworthy, Sirian, Black & Wagner (2002), the correlation between cognitive deficits and adaptive skills was reviewed. Examination of executive abilities in children with autism revealed deficits in their ability to initiate activities and to use problem solving for decision making during play, communication and social interactions. In contrast, Booth et al. (2003), as indicated in the above literature, found that executive functioning on the drawing tasks was not associated with

cognitive deficits in children with autism. This belief relates cognitive style to personal choice rather than deficits in thought processes. Conflicting findings of executive function may exemplify the need for further research on cognitive functioning and the relevance to developmental disabilities, especially autism. Understanding of how these five components are interrelated is crucial for understanding the process of sensory integration and what parents can do to regulate their child's sensory systems.

The Sensory Systems

The primary learning of sensory information is through tactile, vestibular, and proprioceptive senses, which are more commonly known as the "near senses". The term "near senses" is used because in many instances we may not be aware of these sensory systems functioning in our everyday life. The five senses: hearing, seeing, taste, smell and touch are known as the "far senses". They help a person to distinguish information from outside one's body (Kranowitz, 1998).

Rogers, Hepburn and Wehner (2003) report the differences in sensory reactivity among children diagnosed with autism, Fragile X Syndrome, Developmental Disabilities, and typically developing children. Differences are noted among the four groups in regards to sensitivity to various stimuli. A sensory profile indicates that children with autism have a significantly higher score on taste, tactile, and auditory sensitivity when compared to the other three groups.

"Tactile, vestibular, and proprioceptive functions are the building blocks for emotional stability. If these three basic sensory systems are not functioning adequately, the child will probably react poorly to his environment" (Ayres, 1979, p. 62).

"According to sensory integration theory, the tactile, proprioceptive, and vestibular

systems interact routinely with the auditory and visual systems to supply the multimodal sensory information needed to make a meaningful motor response” (Spitzer & Roley, 2001, p. 10).

Tactile System

The tactile system which develops in utero, is important for receiving information regarding light touch, pressure, vibration, temperature, and pain (Tupper & Klosterman Meisner, 1995). In a review of literature, Caulfield (2000) overviews various benefits of tactile stimulation in infancy. It has been found that giving massages to preterm infants throughout the day, can significantly improve their motor and mental state, thus affecting their ability to interpret and accept tactile stimulation. These findings indicate just how important tactile input is in a developing child.

When a child has a disorder, such is the case with autism, the tactile system is not functioning properly. This dysfunction is the result of tactile defensiveness/sensitivity or tactile hyposensitivity. Multiple authors have written about the types of tactile dysfunctions and their affect on the discriminative and protective components of the tactile systems (Ayres, 1979; Koomer & Bundy, 2002; Trott et al., 1993; Tupper & Klosterman Meisner, 1995). In general, the authors explain discrimination as the process that allows for recognition and location of touch, whereas protective responses focus on awareness of dangerous stimuli within the environment. Trott et al. (1993) state that dysfunction in the tactile system may cause the protective system to interpret a simple contact as harmful, thus indicative of tactile defensiveness. Tupper & Klosterman Meisner (1995) describe tactile defensiveness through a child’s experience:

Chad could not tolerate a label in his shirt. If he was bumped in the lunch line, he turned with fists ready to fight. He was not able to tolerate walking in crowds.

He refused to walk barefooted in the grass or on the carpeting. He wore his socks constantly. His mother commented that he had never let her hug him. (p. 11)

According to Ayres (1979) “The tactilely defensive child has too much protective activity and not enough discriminative processing. Instead of finding out what sensations mean, he tends to react to them in a fight-or-flight way” (p. 110). In an effort to explain these reactions, Trott et al. (1993) look at three components of a response: fright, flight, and fight. As indicated from the above example, a fright (walking in crowds), flight (refusal for hugs/walking barefooted) or fight (turning fists) response may be activated.

Trott et al. (1993) define tactile hyposensitivity as a dysfunction in the discriminative process of touch. Tupper & Klosterman Meisner (1995) also address hyposensitivity explaining, “Children with poor tactile sensitivity do not have the benefit of feedback as to how they have moved. It’s as though their skin is covered with a thick coat” (p. 10). A child with autism may have characteristics of under-responsiveness and may fail to become alerted to various sensations, thus explaining the significance of the discriminative function of the tactile system. Children with tactile hyposensitivity are not registering tactile information and may seek out this sensation through inappropriate or constant touching. Other children may be unaware of pain or temperature and its effect on the body. Tupper & Klosterman Meisner (1995) describe this concept in the following:

Benjamin had many symptoms of poor sensory feedback. When he opened the door, he consistently ran it into his foot. As he carried a glass, he was unaware that it was tilting and liquid was penetrating his shirt. While climbing the ladder to the slide, he needed to watch his foot on each step because his leg did not seem to sense how far to lift to reach the next step. Fine motor skills were nearly impossible because he broke his pencils and crayons, tore the paper, and squeezed the glue bottle too hard. (p.10)

A deficit in one's ability to discriminate touch may lead to deficits in gross and fine motor skills and affect daily activities such as dressing, feeding and writing (Koomer & Bundy, 2002; Trott et al., 1993). Being aware of the various types of tactile stimulation is necessary when determining appropriate interventions for a child with autism. Relevant strategies for children with autism who demonstrate tactile dysfunction along with other sensory deficits will be discussed in detail within the section regarding interventions.

Vestibular System

Schubert and Minor (2004) describe the vestibular system as a complex system of the brain which implements key functions in the human body. The main functions of the vestibular system include allowing us to stand up right and keep our balance, processing visual information from the environment, and moving throughout space. According to Kranowitz (1998), the vestibular system has receptors in the inner ear and they allow us to know where our heads and bodies are in regards to the earth. In addition, the vestibular system takes sensory messages about balance and movement from our neck, eyes, and body and sends these messages to the central nervous system to be processed. As a result, we are able to keep our balance when moving through space, process visual information from the environment, and appropriately respond to sensory stimulation. Kranowitz (1998) also states "when messages from the bodies systems are not being sent appropriately to the central nervous system it causes what is know as vestibular dysfunction" (p. 101). In regards to vestibular dysfunction Ayres (1979) writes:

Vestibular dysfunction affects many areas of the body including muscle activity/movement, postural positioning, and visual processing. Vision is an important system associated with the vestibular system. In regards to visual processing, individuals with vestibular dysfunction will show signs of abnormal

visual nystagmus (involuntary back and forth movement of the eye). These body and eye movements are observable characteristic that assists professionals to determine if the vestibular system is functioning inadequately. (p. 70)

Current literature (Dawson & Watling, 2000; Deruelle, Rondan, Gepner, & Tardif, 2004; Maurer & Damasio, 1979) indicates that children with autism experience this inconsistent functioning of the vestibular system and therefore have difficulties perceiving information about their environment. This results in difficulties with movement, balance, postural positioning, and visual processing.

In a study by Maurer and Damasio (1979), children with autism were found to have vestibular abnormalities in posture and balance, and also showed signs of abnormal visual nystagmus due to some form of vestibular dysfunction. A study by Deruelle et al. (2004) note abnormal social characteristics to be the most striking in children with autism; however, these children also present atypical visual processing, for instance, the way they perceive faces and the inability to maintain eye contact.

According to Schubert and Minor (2004) vestibular dysfunction commonly has two types, underreactive or overreactive. Ayres (1979) describes underreactive dysfunction in detail:

The child with an underreactive vestibular system does not process enough vestibular sensations, and so he does not get enough “nourishment” that other children get from body movement and play. However, he does have the inner drive to develop his brain. In addition, the child often does not get dizzy or nauseous until after he has had an enormous amount of movement. It is not surprising, therefore, that these children often like to ride a merry-go-round or roller coaster for a much longer time than other children. In therapy, they often want to go faster and faster on the moving equipment. (p. 80)

When describing the overactive dysfunction Ayres (1979) writes:

The child with overreactive vestibular responses may have two different types either gravitational insecurity or intolerance to movement. When a child has gravitational insecurity they feel fear, anxiety, or distress when even he is in a

position to which he is not accustomed, or when he tries to assume such position, or someone tries to control his movement or position. These children are sometimes afraid of walking up or down a hill, hold on carefully when going up stairs. They do not like to walk on curbs, climb, or ride on things or animals. Leaning over backward from sitting position may be threatening. . . . A child who experiences intolerance to movement feels great discomfort during rapid movement or spinning in circles. These children are apt to become car sick more easily than other children. They become nauseated more quickly when on moving objects and sometimes become nauseated by watching others move or spin. (pp. 83-84, & 88)

After reviewing literature, it is assumed that children with autism have some type of vestibular dysfunction as a result of their disorder; this causes abnormalities in their everyday functioning. However, there are sensory integration strategies and rehabilitation techniques that can be used to assist these children. The strategies and techniques commonly used will be discussed more in depth in the sub-section on intervention strategies.

The Proprioceptive System

Jean Ayres (1979) defines proprioception by writing:

From the Latin word for “one’s own.” The sensations from the muscles and joints. Proprioceptive input tells the brain when and how the muscles are contracting or stretching, and when and how the joints are bending, extending, or being pulled or compressed. This information enables the brain to know where each part of the body is and how it is moving. (p. 183)

“Most proprioceptive input is processed in regions of the brain that do not produce conscious awareness, so we rarely notice the sensations of muscles and joints unless we deliberately pay attention to our movements” (Ayres, 1979, p. 35). Ayres also describes typical proprioceptive functioning as having the ability to perform activities such as: move through space without falling, walk up stairs, get in and out of an automobile, and playing sports.

As in the vestibular system, proprioception also has different types of dysfunction.

Blanch and Schaaf (2001) describe the three different types of proprioceptive dysfunction as: hyporesponsivity to proprioceptive input, seeking of proprioceptive input, and proprioceptive sensitivity. Blanch and Schaaf write:

Children who are hyporesponsive to proprioceptive stimuli demonstrate poor awareness and discrimination of proprioception and consequently have a poor ability to use proprioceptive input for adaptive behavior. These children exhibit some or all of the following signs: break toys easily and appear clumsy, exhibit low (functional) postural tone, and demonstrate tactile discrimination deficits. They enjoy proprioception when it is available, such as engaging in a tug-of-war with the therapist or another child. They also tend to tighten up or 'fix' to provide themselves with the necessary input and to increase proximal stability for distal movement. (p. 115)

When describing a child who is seeking proprioceptive input Blanch and Schaaf write:

Children who actively seek proprioception often engage overactively in behaviors that provide significant input. . . . Children in this group are very active in their search for proprioceptive input and often appear hyperactive and unsafe. For example, they may run quickly and crash repeatedly into the matted walls of the gymnasium. . . . These children provide themselves with proprioception by chewing on nonfood or hard food items, biting, pushing, hitting, scratching, bumping, hurling, and banging. In addition, although they can exhibit adequate control over their movements when they are functioning at their optimal level of arousal, they still appear clumsy in many instances when increasing the speed of their actions due to overstimulation. (p. 116)

Finally Blanch and Schaaf (2001) write:

Children with proprioceptive sensitivity are hyperresponsive to proprioceptive stimuli and often demonstrate anxiety and irritability in response to it. Some of the signs presented by this group of children include anxiety and discomfort when their joints are moved passively, and discomfort when placed in weight-bearing positions. Children who are hyperresponsive to proprioceptive input can also exhibit postural control problems; however, therapists cannot address the postural control problems because of the anxiety these children experience as a result of imposed movement of body parts. Clinical experience suggests that children presenting with this type of modulation disorder are often very young and have been found to have seizure disorders or severe forms of developmental disorders. (p. 116)

A study by Schmitz, Martineau, Barthelemy, & Assaiante (2003) compares the differences in motor control in children with autism and children without autism. The results of the study indicate a significant difference between the two groups of children. The children with autism clearly show a deficient postural anticipation function. Overall, these children show deficits in proprioceptive movements and control of upper body extremities during activity.

Knowing proprioception function in the human body plays a role in motor control and that children with autism have deficits in this area it is necessary to determine appropriate interventions for these children in order for them function adequately in their everyday lives. Blanche and Schaaf (2001) state “activities rich in proprioceptive activity enhance muscle tone, motor planning, postural control, and awareness of gravity and these activities are a key element in sensory integration intervention” (p.114).

It is important for parents of children with autism to know and understand the basics of the three systems (tactile, vestibular, and proprioception) in order to assist in their child’s development. Understanding these systems will also allow parents to have a better understanding of their child’s behaviors, which may lead to an increase in acceptance of the child.

Intervention Strategies

There are many intervention strategies describes throughout the literature on use of sensory integration intervention tasks. This section of the literature review gives an overview of some of the techniques described in the literature. In regards to sensory integration treatment Stancliff (1996) writes:

Inherent in using sensory integration as a treatment approach is setting up a treatment environment that provides an invitation to the child [to activities] that

he or she desires to engage in. The activities are all designed to be as playful as possible. (p. 23)

Stancliff explains, “establishing a routine is extremely important for children with autism because they can become agitated by new sensory input that unfamiliar situations may bring” (p. 23). Stancliff also notes:

Another important factor in treatment is mainstreaming the child into a regular classroom when he or she is ready. When they are in a classroom with only autistic children, it doesn’t offer many opportunities to socialize, but an integrated classroom provides a lot of nice models for them in terms of socialization and play skills. (p. 23)

Wilbarger and Wilbarger (2002) describe their protocol, more commonly known as brushing, as indicated primarily for individuals experiencing sensory defensive behaviors. The authors state the importance of using deep pressure as well as joint compression along the trunk and extremities to decrease hyperarousal.

Cullen and Barlow (2002) describe the importance of the Touch Therapy Program for children with autism. In this study, parents were shown simple massage techniques to practice on the legs, feet, hands, arms, and back of their children. A common theme among the parents was their desire to get closer to their children on a physical and emotional level. This is illustrated in the following example:

When he is upset (having tantrums) I try to hold him. But it just makes it worse, and if I put him down he screams even more, so those times I just have to leave him to get out of it and eventually he crawls onto me for a cuddle and then I will pick him up again. (Cullen & Barlow, 2002, p. 176)

This 8-week-program resulted in an increased closeness of parents with their children as well as the children being able to tolerate touch for completion of everyday tasks such as dressing. One mother states:

He is much happier now being touched. We have always had a problem dressing and undressing him, but he is happy to have his clothes off now, his shoes,

touching parts of him was always quite taboo, but he is allowing us now because of the touch therapy. He is not freezing when strangers brush past him. He is tolerating that. He is actually looking to be much more tactile with other people. Much cuddlier than he was. His grandparents are delighted, they are finally getting that cuddle. (Cullen & Barlow, 2002, p. 178)

A study by Case-Smith & Bryan (1999) examines the effects of sensory integration on children with autism. According to Case-Smith & Bryan “sensory integration is fundamental to the child’s ability to engage in play and sustain interaction” (p. 490). With this belief, engagement in play activities was the overall concept being studied. Vestibular stimulation through the use of suspended swings as well as tactile and proprioceptive input (use of brushing and activities requiring body awareness of limbs) were applied before and after treatment sessions. Baseline and intervention phases indicate that 4 of the 5 children in this study were more engaged in play activities and demonstrated more goal-directed behaviors, thus supporting the use of sensory integration intervention techniques for children with autism.

Edelson, Edelson, Kerr and Grandin (1998) used an experimental and control group to compare the effects from the use of the hug machine on anxiety levels in children with autism. The hug machine, a padded surface in which a child lies down between two boards, can be activated by a lever that the child controls. This lever uses an air cylinder causing boards to come together, resulting in increased pressure. The children in the control group did not have access to this lever and were unable to experience the pressure applied by this machine. Results from this study indicate a significant reduction in anxiety in children who received the deep pressure as compared to the control group.

Olson and Moulton (2004) completed a follow-up study to a mail survey about occupational therapists’ use of weighted vests for children with developmental

disabilities. In the previous study, Olson and Moulton found that 82% of the respondents stated that they used weighted vests with children with autism. Their current study focuses on the use of weighted vests for a duration of 2 hours at a time with a 2-hour interval between sessions. Results of this study indicate that children with autism showed a decrease in rocking behaviors and an increase in eye contact when wearing the vests.

The Importance of Occupational Therapy with Autism

AOTA (2004) describes occupational therapy (OT) as, “skilled treatment that helps individuals achieve independence in all facets of their lives. It gives people the ‘skills for the job of living’ necessary for independent and satisfying lives.” According to Kranowitz (1998):

Occupational therapy is the most beneficial treatment for children with sensory dysfunction such as in autism. Utilizing both science and art, OT is a health profession devoted to helping people with motor and behavior problems learn how to perform purposeful activities. For a child, purposeful activities include making mud pies, climbing, jumping, buttoning, drawing, and writing. Such activities are the child’s “occupation.” In general, OT improves the functioning of a person’s nervous system, which may be damaged . . . or inefficient, as in a child whose behavior is ineffective and inappropriate. (p. 177)

Stancliff (1996) explains the importance of OT through one parent’s perspective:

The occupational therapist explained my child to me so that I could understand what was going on inside. The occupational therapist that we’ve had have helped me learn to make our home a sensory environment for Adam and taught me to tune in to what makes him feel good. They were good at helping us know he was going to need that because the world is stressful for him. (p. 26)

According to Kranowitz (1998), an occupational therapist working with a child who has autism specializes in the area of pediatrics and often has additional training in sensory integration theory and treatment. Children with autism are frequently referred to occupational therapy prior to the age of 3; this is known as early intervention. Kranowitz

also states the occupational therapist plays an important role in the treatment process and will determine the interventions needed to assist the child in everyday activities.

According to Stancliff (1996) another key factor in OT when working with children who have autism is “the therapist can develop a very structured play program to help pull the child’s interest away from preservative behaviors and teach socialization, turn taking, eye contact, and complimenting, among many other skills that are necessary if a child is to enter school” (p. 21).

Occupational therapists also have the ability to administer assessments. In a study by Watling, Deitz, Kanny & McLaughlin (1999) the Bayley Scales of Infant Development is shown to be a key assessment that assists occupational therapists in determining a child with autism’s developmental level. In comparison, Stancliff (1996) states “the evaluation is critical for children with autism to determine sensory thresholds for sensitivity and the types of interventions that will modulate arousal levels and facilitate discrimination and organization of adaptive behavior” (p. 21). Current research (Ahn, Miller, Milberger, & McIntosh, 2004; Cohn, 2000; and Stancliff, 1996) indicates children with autism seem to have sensory processing dysfunctions and therefore are in need of sensory integration treatment.

Parental Issues

Children with autism often have important people within their lives such as occupational therapists, speech therapists, doctors, friends, and relatives (Cohn, 2001). However, current research (Cohn, 2001; Cohn, Miller, & Tickle-Degnen, 2000; Kranowitz, 1998; Stancliff, 1996) indicates parental figures are the most important component in the treatment process for children with autism. Stancliff (1996) notes:

Parents really are the most important members of the team treating the child with autism. The child may see three or four specialists for 1 to 2 hours each week. But for a child with sensory integration and behavioral problems, as well as learning disabilities, this is relatively little time to ingrain new learning and behavioral patterns. The key to improvement is the parent who is willing and dedicated to continuing treatment activities at home. . . . The goal is to get the parents involved, follow through, and be consistent, because these kids learn from consistency and feel comfortable with it. (p. 25)

The concept of transferring treatment from therapy into the home seems simple enough for any parent to follow. However, present literature (Ahn et al., 2004; Cohn, 2001; Cohn et al., 2000; Stancliff, 1996) indicates parents are having difficulties implementing treatment into the home environment due to a lack in education.

Based on the results of a study by Cohn (2000) the dominant need parents are seeking to have met is to understand their child's behaviors and why they occur. It was also revealed parents are in search of education in regards to treatment techniques and interventions to use within the home environment. Within this same study came about two core categories from parents' perspectives. The categories include child-focused outcomes and parent-focused outcomes. Each category consists of themes which determine the outcomes parents perceive for their child and themselves. The three themes within the child-focused outcome include a desire for an increase in social participation, developing coping mechanisms to regulate behaviors, and for their child to have feelings of self-confidence. Within the parent-focused outcome two themes evolved, learning strategies to support the child and receiving support from other parents. Results from a correlation study by Cohn et al. (2000), indicated that if parents could understand their child's behaviors from a sensory perspective they could then appreciate their child more; leading to improved treatment within the home.

After a review of literature, it is apparent that parents of children with autism are seeking education in different areas including understanding their child's behavior from a sensory perspective and learning techniques to implement in the home.

CHAPTER III

METHODOLOGY

Autism is a neurological disorder that can affect several areas in a child's everyday activities and routines. A child with autism may exhibit eccentric behaviors, poor social skills and sensory deficits. Along with having lasting affects upon the child, autism can also have an extensive impact on the parents. It is crucial that parents of children with autism understand their child's behaviors and utilize techniques to ensure their child's quality of life. A practicing occupational therapist also indicated that there is a need for extended parent education pertaining to children with autism and the interventions that can be used.

With the guidance of a faculty advisor, a topic proposal was developed; this was approved by the University of North Dakota Graduate School. The proposal briefly summarized areas to be addressed in the literature review and included an outline of the contents of the project; a manual for use by parents of children with autism and sensory integration deficits under the guidance of an occupational therapist. The purpose of the manual is to help the parents understand their child's behaviors and it includes intervention strategies that can be used in the home setting.

A review of current literature was done in order to provide accurate and current information for the compilation of the parent manual. The initial literature that was

reviewed was on autism and sensory integration treatment, this was done to gather background information for the manual. The second body of literature that was reviewed pertained to the how sensory integration intervention was used with children with a diagnosis of autism. This led to literature relating to parent issues in regards to understanding their child's behaviors and caring for a child with autism. Further information on parental issues was gathered from a wide range of supporting journal articles and books, and by talking to professionals currently working with children who have autism.

The section of the manual that includes the sensory integration intervention techniques for children with autism was based on information in supporting journal articles and books by occupational therapists and others with a background in treating children with autism. Treatment interventions were also suggested by occupational therapists who are currently using sensory integration intervention techniques to treat children who have a diagnosis of autism.

The review of literature served as a guide and foundation for developing the product of this project; *Parent Educational Manual: Using Sensory Integration Techniques for Children with Autism*. Chapter IV of this document is the parent education manual.

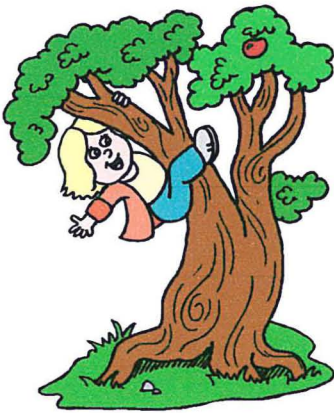
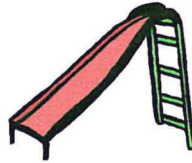
CHAPTER IV

PRODUCT

The authors' product is an educational manual for parents who have children with autism. Parenting is a difficult job for anyone. However, as a parent of a child with autism, this job becomes more challenging and can seem overwhelming at times. This manual was designed to help parents, and includes various interventions and techniques that parents and other caregivers can implement to regulate sensory input in children with autism.

It is the intent of the authors' for the manual to be given to parents by therapists involved in treating their child with sensory integration dysfunction and a diagnosis of autism. Chapter 1 is an introductory section defining sensory integration (SI), and describing the processes that typically occur in the central nervous system. Chapter 2 has a focus on the three main sensory systems: vestibular, tactile, and proprioceptive. The importance of modulating these systems for optimal performance in one's environment is also described. Chapter 3 of the manual is an introduction to various types of intervention strategies that can be implemented for children with autism. Chapter 4 includes a variety of resources parents can utilize when researching autistic disorder. Appendix A and B includes sensory checklists and schedules that parents of children with autism can implement within the home setting.

Sensory Integration & Autism



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PREFACE

The authors' product is an educational manual for parents who have children with autism. Parenting is a difficult job for anyone. However, as a parent of a child with autism, this job becomes more challenging and can seem overwhelming at times. This manual was designed to help parents, and includes various interventions and techniques that parents and other caregivers can implement to regulate sensory input in children with autism.

It is the intent of the authors' for the manual to be given to parents by therapists involved in treating their child with sensory integration dysfunction and a diagnosis of autism. Chapter 1 is an introductory section defining sensory integration (SI), and describing the processes that typically occur in the central nervous system. Chapter 2 has a focus on the three main sensory systems: vestibular, tactile, and proprioceptive. The importance of modulating these systems for optimal performance in one's environment is also described. Chapter 3 of the manual is an introduction to various types of intervention strategies that can be implemented for children with autism. Chapter 4 includes a variety of resources parents can utilize when researching autistic disorder. Appendix A and B includes sensory checklists and schedules that parents of children with autism can use within the home setting.

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Chapter 1

Sensory Integration

Sensory Integration is defined as “the organization of senses for use; our senses give us information about the physical conditions of our body and the environment around us” (Ayres, 1979, p. 5). According to Williamson and Anzalone (1996) in Yack et al. (1998), there are five components of how sensory integration works within the human brain: sensory registration, orientation, interpretation, organization of a response, and execution of a response. These components and the implications for children with autism are listed below. The following information is adapted from (Ayres, 1979; Frith, 2003; Trott et al. 1993).

1) Sensory Registration

- ❖ Is an automatic process that occurs within the brain in which a person is able to recognize information from the environment through the senses.
- ❖ Occurs when a person becomes aware of sensations whether it is someone touching you or hearing the sounds of an airplane in the sky.
- ❖ Includes a part of the brain that decides which sensory information is important to pay attention to and which kind is not important.

Sensory Registration in a child with autism

- ❖ Is considered abnormal
- ❖ Can be seen as being “hypersensitive”: registering too much information **AND/OR** “hyposensitive”: not registering the right amount of information.

| Registration | Hyposensitive | Hypersensitive |
|---|----------------------|-----------------------|
| Doesn't like the feel of certain textures | | X |
| Bothered by certain sounds such as a toilet flushing | | X |
| Doesn't pay attention to loud sounds | X | |
| Not aware of cuts or bruises on body | X | |
| Fear of heights and movement | | X |
| Can spin for long periods of time without getting dizzy | X | |

2) Orientation

- ❖ Process of either paying attention to or ignoring sensory information from our environment.
- ❖ For orientation to occur, an individual must be able to modulate or “adjust” the amount of information that comes in through the senses.
- ❖ Ayres (1979) compares the process of modulation to volume control:
 If there is too much information coming in at one time we need to “turn down the volume”. This is done through inhibition:
Inhibition - Means to lower the amount of unimportant information that the brain takes in through the senses.
Results of Inhibition - Allows for children to concentrate on information they learn in class rather than focusing on background noises in the classroom.
- ❖ If a person needs help in focusing on important information, facilitation takes place which means to “turn up the volume”.
Facilitation – Means to turn up the flow of information, which is important for an individual to complete a certain task.
Results of Facilitation - Allows for individuals to concentrate on important information. When a child is in the classroom and begins to fall asleep, he/she “turns up the volume” to help concentrate in the classroom setting.

Orientation in a child with autism

- ❖ Have difficulties modulating or “adjusting” what information in the environment is important and what can be ignored.

Frith (2003) describes this concept through the eyes of an adult reflecting on her childhood and the effects of autism:

I liked to sit for hours humming to myself and twirling objects or dribbling sand through my hands at the beach. I remember studying the sand intently as if I was a scientist looking at a specimen under the microscope. I remember minutely observing how the sand flowed, or how long a jar lid would spin when propelled at different speeds. My mind was actively engaged in these activities, I was fixated on them and ignored everything else (p. 173).

- ❖ In the above example, the individual was unable to “adjust” by either “turning up the volume or lowering the volume”.
- ❖ This resulted in her focusing on unimportant information (looking at the flow of the sand rather than making a sandcastle).

3) Interpretation

- ❖ To understand and recognize different sensations, which may occur through hearing, vision, or any of the other senses.
- ❖ A “typically” developing person is able to interpret sensory information and can respond to it in an appropriate manner.

Interpretation in a child with autism

- ❖ May interpret a simple handshake or pat on the back as threatening because they may be “overly” sensitive to touch OR may not even feel certain sensations such as cuts or bruises on body because of “under” sensitivity.
- ❖ As a result of not being able to interpret information correctly, a child with autism may respond in the following ways:

There are three ways a person with autism can respond to sensory information (Trott et al. p. 19-20)

1. Flight response = running away from people or objects
2. Fright response = appear shy and hesitant to communicate
3. Fight response = may act physically and verbally aggressive to others

4) Organization

- ❖ Completion of this step requires an individual to be able to register, orient, and interpret various sensations within the environment.
- ❖ Once those tasks have been completed, a person can organize and decide how to respond.

Organization in a child with autism

- ❖ Because it is difficult for them to register, orient, and interpret sensations, children with autism have difficulties organizing a response.
- ❖ The child may not register that someone has tapped him or her on the shoulder causing there to be no response OR the child may be “too sensitive” and respond by “fright, flight, or fight” mechanism.

5) Execution

- ❖ This is the final step in the sensory integration process
- ❖ A “typically” developing person is able to use the five steps to make decisions throughout the day and this is achieved through motor planning.

Motor planning = process of being able to register, organize and carry out responses that are both familiar and unfamiliar. A child uses motor planning everyday by deciding what game to play at recess or perhaps learning how to tie their shoelaces for the first time.

Execution in a child with autism

- ❖ Children with autism have deficits in their ability to adapt, attend, and orient.
- ❖ Because children with autism have difficulties with sorting out sensory information, there may be problems in one’s ability to motor plan.
- ❖ As a result, children with autism are more likely to engage in behaviors that are routine because a certain response is known.
- ❖ Ayres (1979) relates execution of a response in a child with autism to the “I Want to Do It” (p. 127) function in the following ways:
 - Since a child with autism has difficulties registering senses, he or she may not want to complete an activity such as tying a shoelace.
 - A child with autism may not be willing to learn new tasks either, because of the difficulties in motor planning and forming a response.

Chapter 2

The Sensory Systems

Children with autism can experience dysfunction in any of the following systems within the body:

- ❖ The Vestibular system
- ❖ The Tactile system
- ❖ The Proprioceptive system

If your child experiences a dysfunction in any of the three systems listed above they can exhibit a variety of observable behaviors and symptoms. Therefore, it is important for you, as parents, to know the different behaviors and symptoms and why they occur. It will then be easier for you to understand your child from his/her point of view and provide him/her with the best care and treatment needed.

Throughout this chapter you will find general information pertaining to the three systems, behaviors and symptoms that can occur and why, and scenarios of children who experience different behaviors and symptoms.

The Vestibular System

Have you ever felt dizzy or off balance? More than likely we have all had one or both of these sensations at least one time in our life. Feeling dizzy and off balance are just two examples of the many sensations that come from the vestibular system. The

vestibular system provides our body with many things: (Schubert & Minor, 2004):

- ✓ Stand up straight
- ✓ Walk down a sidewalk
- ✓ Step over a street curb
- ✓ Easily move our body from one position to another
- ✓ Determine whether we are moving or standing still
- ✓ Determine if objects are moving or motionless in relation to our body

- ✓ Lets us know the direction and speed of our movements

According to Kranowitz (1998), we need to accurately process vestibular information to properly use our vision. This has an effect upon the way we process everything we see within the environment including people, animals, trees, buildings, colors, and shapes.

The vestibular and visual systems also work together to allow us to stand upright. Along with the visual system the vestibular system also has a strong relationship with the auditory system; both respond to vibration. The vestibular system also helps us maintain balance, plan our actions, move, calm ourselves, and regulate our behaviors. As you can see the vestibular system plays a huge and crucial role in the way we function everyday.

Jean Ayres, 1979, an occupational therapist, illustrates this concept:

The vestibular system is the unifying system. It forms the basic relationship of a person to gravity and the physical world. All other types of sensation are processed in reference to this basic vestibular information. . . . Vestibular input seems to "prime" the entire nervous system to function effectively. When the vestibular system does not function in a consistent and accurate way, the interpretation of other sensations will be inconsistent and inaccurate, and the nervous system will have trouble getting started. (p.99)

What Happens when the Vestibular System is not Functioning Correctly?

Messages are constantly being sent back and forth from different parts of our body to our brain; these messages allow us to perform everyday tasks. But when these messages are not being received appropriately it causes what is known as vestibular dysfunction (Schubert & Minor, 2004).

Vestibular dysfunction can affect/cause:

- ✓ Movement and balance
- ✓ Motor planning
- ✓ Using both our hands at one time
- ✓ Auditory processing
- ✓ Self-esteem
- ✓ Difficulties making friends

- ✓ Inadequate gaze
- ✓ Difficulties focusing on moving objects
- ✓ Confusion when looking up at one object and then looking at another
- ✓ Seeing double
- ✓ Difficulty with schoolwork involving the size and spacing of letter, words, and pictures (Kranowitz, 1998)

Vestibular dysfunction can occur in two different forms, hyposensitive or hypersensitive (Schubert and Minor, 2004).

Hyposensitive Vestibular System

Children who have a “hypo” or under reactive vestibular system are not getting the right amount of sensation into their body in order to function typically. Children with a hyposensitive vestibular system usually become very anxious or even avoid typical activities of childhood including: climbing trees, playground rides, rollerblading, and gym.

Behaviors and Signs of a Hyposensitive Vestibular System:

- ✓ Appearing depressed
- ✓ Fatigued
- ✓ Withdrawn
- ✓ Spinning in circles and without becoming dizzy/nauseous
- ✓ Head banging on objects
- ✓ Low attention span
- ✓ Constantly touching others around him/her
- ✓ Uncoordinated and or clumsy
- ✓ Enjoys swinging high or jumping on trampolines
- ✓ Repeatedly and vigorously shaking his/her head (Tupper & Klosterman Miesner, 1995)

A scenario of a child who is hyposensitive to vestibular input may be something like this:

Billy is playing outside on the playground with his kindergarten class. All of the children are standing in a circle around their teacher waiting to play a game of duck-duck-goose. The teacher begins to give the directions and notices Billy run off towards the merry-go-round. Once at the merry-go-round, Billy gives it a push and jumps on. While spinning very fast on the merry-go-round, Billy also

begins to vigorously shake his head back and forth from side to side. The teacher asks Billy to come back and join the rest of the class. When he gets off the merry-go-round, the teacher also notices Billy's reaction to the fast spinning, he did not appear to be dizzy or off balance, but he just ran back to the class laughing as though nothing had happened.

This scenario is a good example of what may happen with a child who is hyposensitive to vestibular input. As described, Billy was enjoying the spinning motion of the merry-go-round and he vigorously shook his head while spinning. The reasoning behind Billy's behaviors is his need for vestibular input. By spinning very fast and shaking his head Billy was able to receive the input he needed to "get in gear".

Hypersensitive Vestibular System

A child who has a "hyper" or over reactive vestibular system is getting too much sensation into their body; this then causes him/her to feel anxious or excited. These children interpret many sensations and movements as being potentially harmful.

Behaviors and Signs of a Hypersensitive Vestibular System:

- ✓ Jumpy
- ✓ Anxious
- ✓ Overly aggressive with toys and other children
- ✓ Fast and excited speech
- ✓ Intense fear of fast movement
- ✓ Fear of being moved by others
- ✓ Fear of climbing or walking up stairs
- ✓ Dislike of playground activities (i.e. merry-go-round, teeter-totter, swings)
- ✓ Easily nauseated or dizzy from small amounts of movement
- ✓ Tight or tense grip when holding objects
- ✓ Dislike of having head moved or tilted (i.e. when shampooing his/her hair)

Kranowitz 1998, illustrates this concept in the following scenario:

Sean, four, dislikes most music and movement activities. "Non-competitive" musical chairs make him feel especially uncomfortable. While the other children run freely around the circle, he inches along, clinging to the seats of the chairs. By the time he has circled the chairs twice, his forehead is sweaty, and his stomach is churning. The music finally stops, and Sean sits down with a sigh of relief. When the music returns, he remains seated. (p. 104)

Other symptoms/behaviors that can be associated with both hypersensitive and hyposensitive vestibular dysfunction include:

- ✓ Loose or floppy body
- ✓ Inability to sit straight in a chair
- ✓ Abnormal postures and balance
- ✓ Digestion problems
- ✓ Difficulties learning to toilet independently
- ✓ Difficulties making friends and relating to peers
- ✓ Low self-esteem
- ✓ Troubles responding to others' questions and comments
- ✓ Fatigues easily

The above information was adapted from the following (Ayres, 1979; Kranowitz, 1998; Tupper & Klosterman Miesner, 1995).

The main goal for children with vestibular dysfunction is getting them to function at a level that is between the two spectrums of hyposensitivity and hypersensitivity. When there is a balance, a child will then be able to function normally within his/her environment (Tupper & Klosterman Miesner, 1995).

Who has Vestibular Dysfunction?

Vestibular dysfunction can occur in young children with a variety of disorders including: cerebral palsy, attention deficit disorder, and developmental delays (Tupper & Klosterman Miesner, 1995). Children with autism have also been known to make up a large portion of those who experience some type of vestibular dysfunction (Dawson & Watling, 2000; Deruelle, Rondan, Gepner, & Tardif, 2004; Maurer & Damasio, 1979). Frequently parents of children with autism have a hard time understanding why their child exhibits certain behaviors. The behaviors and symptoms listed throughout this section are exhibited by a child who is experiencing vestibular dysfunction. A child who exhibits these non-typical behaviors is attempting to either give his/her body “more”

input or because he/she is experiencing “too much” input. When a child receives the “right” amount of sensations into his/her body it makes them feel good and they are then able to perform their everyday activities.

Tactile System

Imagine walking barefoot on a sandy beach...you can feel the warm sand between your toes, and the cool breeze against your skin. It is through our sense of touch that we are able to feel these sensations. Our tactile system, more commonly known as touch, is one of the first senses to develop in the womb.

Discriminative and Protective Touch

The tactile system allows us to feel different types of touch. These various types are identified as being discriminative and protective (Yack et al. 1998). Discriminative touch allows us to be aware of similarities and differences between objects. This is illustrated through the following example:

A friend comes up behind you and taps you on the shoulder with her finger. Although you can't see this happening, it is through discriminative touch that you are able to recognize that it is someone's finger. On the other hand, the protective type of touch warns us when there is danger. For instance, picture yourself sitting around a campfire and roasting marshmallows. All of a sudden, a flame in the fire gets bigger and almost burns your hand. It is through the protective system, that we are able to step away and prevent getting burned.

Both the discriminative and protective systems are important for completion of everyday activities such as getting dressed in the morning, preparing meals, and completing tasks at one's job.

A typically functioning tactile system has a balance between the discriminative and protective functions. This balance allows an individual to know which touch is alarming, which touch is pleasurable, which touch can be ignored, and which touch needs to be

explored. When this balance is disrupted, as is the case of children with autism, one may see signs of tactile dysfunction (Yack et al. 1998). According to Tupper and Klosterman Meisner (1995), tactile dysfunction is defined as either an over or under sensitivity to touch.

Tactile Hypersensitivity

A child who has an oversensitivity to touch or feels too much is known to have tactile defensive behaviors.

Behaviors and Signs of Tactile Hypersensitivity

- ✓ Avoiding Certain Textures
- ✓ Refusing to get dressed in the morning
- ✓ Pay attention to unimportant details (tag on back of shirt) Constantly rubbing or pulling at clothes
- ✓ Acts aggressively when others get close to them or bump into them
- ✓ Dislikes touch on hand by glue, paints, or other objects that are wet or dirty
- ✓ Picky eater (only likes certain textures of food)
- ✓ Dislikes brushing teeth or hair
- ✓ Reacts negatively to light touch
- ✓ Avoid walking barefoot on grass or sand
- ✓ Dislikes having fingernails trimmed (Kranowitz, 1998)

Tupper and Klosterman Miesner (1995) further describe tactile defensiveness through a child's experience:

Chad could not tolerate a label in his shirt. If he was bumped in the lunch line, he turned with fists ready to fight. He was not able to tolerate walking in crowds. He refused to walk barefooted in the grass or on the carpeting. He wore his socks constantly. His mother commented that he had never let her hug him. (p. 11)

This example is just an indication of what children and parents may encounter when trying to understand what aspects are involved in tactile defensiveness.

Why does tactile defensiveness occur?

In order to understand why tactile defensiveness occurs, Ayres (1979) states “The tactilely defensive child has too much protective activity and not enough discriminative processing. Instead of finding out what sensations mean, he tends to react to them in a fight-or-flight way” (p. 110).

As mentioned in Chapter 1, there are three ways a child with autism responds to sensory information (Trott et al. p. 19-20)

1. Flight response = running away from people or objects
2. Fright response = appear shy and hesitant to communicate
3. Fight response = may act physically and verbally aggressive to others

These responses were shown in the scenario above:

1. Flight (refusal for hugs/walking barefooted)
2. Fright (walking in crowds)
3. Fight (turning fists)

Tactile Hyposensitivity

Being under sensitive, otherwise known as hyposensitivity, is on the opposite spectrum in regards to interpreting tactile sensations.

Behaviors and Signs of Tactile Hyposensitivity

- ✓ Use toys for purposes other than intended (i.e. enjoys the toy because of the texture vs. actually playing with the object)
- ✓ Unable to identify which body parts have been touched without looking
- ✓ Unaware of cuts or bruises on body
- ✓ Difficulty in detecting cold/warm objects on skin
- ✓ Be unable to perform motor tasks such as zipping and buttoning
- ✓ Unable to tell the difference between various textures (smooth vs. rough)
- ✓ Have problems manipulating small objects
- ✓ Unaware of touch unless it is very intense (Kranowitz, 1998)

Tupper & Klosterman Meisner (1995) address hyposensitivity by explaining, “children with poor tactile sensitivity do not have the benefit of feedback as to how they have moved. It’s as though their skin is covered with a thick coat” (p. 10). Individuals who

are experiencing hyposensitivity may have a delayed reaction to touch and this is a major concern to parents because their child's ability to detect injury is impaired. Yack et al. (1998) illustrate this concept:

Michael and his class went to a conservation area for a class trip. They decided to walk through a stream in bare feet to cool off. Immediately after entering the stream, screams could be heard from Michael's classmates who quickly scrambled onto the grass. There were sharp stones in the stream that had cut the children's feet. Michael was enjoying the swish of the water around his feet and continued to walk in the stream. When his teacher asked him to come out of the water to check his feet, Michael was surprised to see the cuts on his feet. Later, at home, Michael would not let his mom wash his feet because they hurt. (p. 36)

Children who are not receiving the adequate amount of tactile sensation, may also display behaviors that "seek out" input from a variety of objects and or people. For instance, a child with hyposensitive behaviors may always touch people or need to have a fidget toy with them at all times. The authors' explain hyposensitivity through the following story:

Benjamin had many symptoms of poor sensory feedback. When he opened the door, he consistently ran it into his foot. As he carried a glass, he was unaware that it was tilting and liquid was penetrating his shirt. (p. 10)

Parenting a child with autism who demonstrates either hypo or hypersensitivity to touch can be challenging. The behaviors and symptoms listed above are a result of a child who is experiencing tactile dysfunction. Although it is difficult to understand why these processes occur, it is important to focus on strategies that can help the child complete activities of daily living such as dressing, playing, and eating. These strategies will be discussed in Chapter 3.

Proprioceptive System

The proprioceptive system refers to the “sensory information caused by contraction and stretching of muscles and by bending, straightening, pulling, and compression of the joints between the bones” (Ayres, 1979, p. 35). In essence, proprioception is the unconscious awareness of body position and communicates to the muscles how much force is necessary for muscles to apply and change movements (Yack et al., 1998). Proprioception input tells the brain when and how the muscles are moving and allows an individual to know where and how the body is moving without having visual assistance (Tupper & Klosterman Miesner, 1995).

A good example of how the proprioception system works is to picture yourself sitting on a chair with your feet flat on the floor. Because of the proprioceptive system you are able to know that your feet are on the floor and your bottom is on the seat of the chair without looking down.

“Because the proprioceptive and tactile systems are so closely linked, often times you will hear of professionals sometimes speak of tactile-proprioceptive or vestibular-proprioceptive” (Kranowitz, 1998, p. 133).

- ✓ **Tactile-proprioceptive** means you have the ability feel the sensations of touch and body position at the same time. For example, you are able to tell how heavy a glass of milk is or how tight to hold a pencil to write.
- ✓ **Vestibular-proprioceptive** means the feeling sensations of the head and body position when actively moving. For example, you need this form of proprioception to throw a ball or climb stairs.

According to Kranowitz (1998), the proprioceptive sense affects many everyday skills such as:

- ✓ Writing
- ✓ Eating with a spoon
- ✓ Buttoning a shirt
- ✓ Walking up and down stairs
- ✓ Postural stability (sitting/standing upright)
- ✓ Emotional security (lack self-confidence, timid)

The following is an example adapted from Kranowitz (1998). The scenario is a little girl whose emotional security is affected by her proprioceptive system:

For Sara, five, almost everything she does requires effort-getting out of bed, dressing, walking to school, doing her work sheets, playing at the playground, and going on errands with her mother. She doesn't feel good about herself or the world she inhabits. Her sense of insecurity results from the undependable messages coming from her body, which doesn't move the way she wants it to. She has little self-confidence. (p. 139)

According to Williamson and Anzalone (1996) in Yack et al. (1998), some children do not adequately receive or process information from their muscles, joints, tendons, or connective tissue and this results in insufficient feedback about movements and body position. As with the vestibular and tactile systems, this inconsistent functioning of the proprioceptive system is called proprioceptive dysfunction. **Proprioceptive dysfunction is the inefficient processing of sensations perceived through**

- ✓ Muscles
- ✓ Joints (structure between two bones)
- ✓ Ligaments (joins bone to bone)
- ✓ Tendons (attaches muscles to other muscles or bones)
- ✓ Connective tissue (supports the body's organs and limbs (Kranowitz, 1998)

Blanch and Schaaf (2001, p. 115-116) describe two different forms of proprioceptive dysfunction: Under or hyporesponsivity to proprioceptive input and seeking of proprioceptive input. According to Schmitz, Martineau, Barthelemy, & Assaiante (2003), children with autism often display signs of both hyporesponsivity to proprioception input and seeking of proprioception input. Some of the common signs are listed below to give you an idea of the behaviors caused by either of the two forms of proprioception dysfunction.

A child who is “under” or hyporesponsive to proprioceptive input may experience some or all of the following signs:

- ✓ Break toys easily
- ✓ Demonstrate poor awareness and discrimination
- ✓ Appear clumsy
- ✓ Low postural tone (floppy or loose body)
- ✓ Tactile discrimination deficits (i.e. difficulty picking up objects, hot/cold discrimination)
- ✓ Enjoy proprioception input: playing tug-of-war
- ✓ Tighten up body parts
- ✓ Struggle to open doorknobs
- ✓ Tackle everything and everybody
- ✓ Trouble lifting or holding objects of different weights

According Williamson and Anzalone (1996) in Yack et al. (1998), a child will exhibit these behaviors to increase his/her knowledge of where his/her body is in space and to increase his/her body awareness.

A child who is seeking proprioceptive input may experience some or all of the following:

- ✓ Engage in overly active behaviors
- ✓ Appear hyperactive or unsafe
- ✓ Rock back and forth
- ✓ Head banging
- ✓ Hide under heavy blankets or squeeze between furniture
- ✓ Run quickly and purposefully crash/bump into objects
- ✓ Slap or stomp feet on the ground when walking
- ✓ Jumping on the beds/couch
- ✓ Enjoys to be tightly swaddled in a blanket
- ✓ Rubs hands, cracks knuckles, or sucks on fingers
- ✓ Chews constantly on objects (i.e. shirt collars, strings, pencils)

According Williamson and Anzalone (1996) in Yack et al. (1998), a child may exhibit proprioceptive seeking behaviors because they are not adequately receiving and processing proprioceptive input or because they are using proprioceptive stimulation to reduce over sensitivity to other sensations.

An example from a child’s perspective of poor proprioception is as follows:

Lindsey was holding the therapist's hands when jumping on a mini-trampoline as part of her therapy session. She commented that she could not close her eyes because her legs would not tell her where to jump. (Tupper & Klosterman Miesner, 1995, p. 13)

The following is another example of a child experiencing many symptoms of poor proprioception:

When Benjamin opened the door, he consistently ran it into his foot. As he carried a glass, he was unaware that it was tilting and liquid was penetrating his shirt. While climbing the ladder to the slide, he need to watch his foot on each step because his leg did not seem to sense how far to lift to reach the next step. Fine motor skills were nearly impossible because he broke his pencils and crayons, tore the paper, and squeezed the glue bottle too hard. (Tupper & Klosterman Miesner, 1995, p. 10)

As noted above, children with autism can show behaviors of a proprioceptive dysfunction whether it be hyporesponsivity to proprioceptive input or seeking of proprioceptive input.

How a child may feel with proprioceptive dysfunction:

- ✓ Makes him/her feel off balance
- ✓ Not knowing where his/her arms and legs are positioned
- ✓ An out of control feeling
- ✓ Clumsy
- ✓ Fearful when moving (Kranowitz, 1998)

As a parent knowing the common behaviors and the reasons why your child may be exhibiting them allows you to learn and provide the best intervention strategies that fit your child's needs. Providing the right intervention strategies will then lead to your child having the ability to "feel good" inside and have better control over his/her body functions. A variety of intervention strategies are provided in Chapter 3.

Chapter 3

Intervention Strategies

According to Reed and Sanderson (1983, p. 132), “activities have a logical sequence of steps which facilitate...performance.” Occupational therapy is the most beneficial treatment for children with sensory dysfunction, especially children diagnosed with autism (Kranowitz, 1998).

- The profession is designed to help children learn and perform activities of daily living such as getting dressed in the morning, eating, and playing with peers. Through the assistance of an occupational therapist, parents can implement the intervention activities in this chapter within the home environment.
- It is important to know that the numerous types of strategies provided can be used in combination when treating tactile, proprioceptive, and vestibular dysfunctions.

The intervention strategies included in this chapter will assist you in providing your child with the right amount of sensory experiences for him or her to function in the home environment. These activities will form a “sensory diet” for your child by providing a “just right” combination of sensory input to achieve and maintain optimal levels of arousal and performance in the nervous system (Wilbarger & Wilbarger, 2002).

Benefits of a “Sensory Diet”

- Provides activities that are calming or alerting to help balance a child’s sensory experiences
- Helps the child to learn how to control behaviors by finding alternative ways to cope with an over or under responsiveness to sensations
- Assists the child in registering and organizing sensory information for appropriate adaptive responses

| Alerting Activities for Hypo-responsive children with autism | Calming Activities for Hyper-responsive children with autism |
|---|---|
| Light Touch | Firm, deep pressure |
| Jumping up and down | Slow rocking, swaying |
| Fast swinging | Cuddling |
| Quick, unpredictable movement | Joint compressions |
| Tag games | Reduced noise |
| Toys with sounds and lights | Reduced light levels |
| Bright lighting | Muscle relaxation techniques |

It is important that the child’s response be watched. For example, an activity that can be calming to a child with autism, could turn around and be alerting the next day. The following information was adapted from (Kranowitz, 1998; Yack et al., 1998).

Many of the following activities were adapted from (Kranowitz, 2003; Tupper & Klosterman Miesner, 1995; Yack et al.,1998). The rest of the activities were developed by the author’s. These interventions will assist in regulating your child’s tactile, proprioceptive, and vestibular input.

Intervention Strategies

➤ **Hide-and-Seek Game**

Benefits of activity: This activity will assist the child in learning how to discriminate between different objects and to improve attention span for other activities completed throughout the day. Through rolling, squeezing, and molding the playdough/theraputty, children can improve tactile perception, proprioception (calming and organizing activity), and fine motor skills. These functions are needed for tasks such as buttoning a shirt or writing on a piece of paper.

Items needed:

1. Theraputty OR playdough, which can be bought at Walmart or Target.
2. Little objects such as buttons, beads, pebbles, and coins
3. Containers for sorting the objects when found

* Homemade playdough can also be used. Ingredients include:

- 2 cups flour
- 1 cup salt
- 4 teaspoons cream of tartar
- 2 cups water
- 4 tablespoons vegetable oil
- Large cooking pot and wooden spoon
- Optional: food coloring or scents such as peppermint (to provide **Alerting** stimuli for the child)
- Plastic container to store playdough

Preparation: In a large pot, stir flour, salt, cream of tartar, water, and oil over very low heat until the dough comes away from the edge of the pot and makes a soft ball. Let the playdough cool and enjoy!

What to do: Hide small objects (i.e. buttons, beads, etc) in the theraputty or playdough. Ask the child to pick out these objects and place them into the empty container.

Variations: The child can make or imitate different shapes with the playdough/theraputty. He or she can also make people or animals, such as rolling the playdough to make a snake. Use of cookie cutters and other objects can be a fun way for children with autism to learn patterns and shapes.

➤ Buried Treasures Game

Benefits of activity: Being able to identify certain objects by touch will help the child in other tasks such as getting dressed in the morning, brushing one's teeth, and eating.

What to do: Have a sensory bin filled with various objects in which the child must identify by touch. Remember to tell the child – NO PEEKING when completing this game!! Sensory items that can be included in this bin are as follows:

- Cotton balls
- Coins
- Dice
- Rubber bands
- Buttons
- Comb
- Small toy

NOTE: Once the child has identified the various items by touch, ask the child the following questions. What is the shape of the object? Does it feel cool or warm? What about the texture, is it smooth or rough?

➤ Everyday tasks

Benefits of these activities: Allows the child to register and respond to a “higher” amount of sensory input and to practice learning new tasks, which is often difficult for children with autism.

What to do: Provide opportunities for the child to do “**heavy work**” around the house. Examples may include:

- Carrying groceries and pushing the grocery cart
- Help with watering plants/flowers
- Hanging laundry
- Vacuuming

➤ **Animal Picture Book**

Benefits of activity: This activity will allow for the child to be able to register information more accurately and will aid in tactile discrimination of sensations. Through the use of different types of fabric, the child will get a better understanding of his/her tactile sensations.

Items needed:

1. Magazines or books to obtain animal pictures
2. For appropriate fabrics, may need to get samples from fabric store
3. A scissor to cut out the pictures (the child may need assistance with cutting)
4. Tag board or cardboard to place the pictures and fabric on
5. Glue or tape for making the picture book with the fabric and pictures

What to do: Have the child make a picture book of different animals and the textures that apply to that certain animal.

The following are examples of animals and fabric that may be used:

- Pig = Potato sack material
- Cow = black and white felt material
- Snake = Silk material
- Turtle = Sandpaper
- Horse = Suede material
- Chick = Cotton balls

➤ **Scavenger Hunt**

Benefits of activity: Wearing the bracelet, touching the items found, and touching the sticky tape all help increase tactile perception. Walking and talking can help the child in developing vocabulary and language skills.

Items needed:

- Masking tape, preferably the wide width

What to do: Tear off a piece of tape just long enough to fit around the child's wrist. Place the tape so the sticky side is facing up. Take a walk around the block or to a local park. As you walk, pick up small items such as flowers, leaves, feathers, grass, and so forth. Have the child place these objects on the sticky part of the tape and add items until the "bracelet" is complete.

- **Fun Games** Introduce activities that can help with over and under responsiveness in all three systems: vestibular, proprioceptive, and tactile.
 - **Duck Duck Goose**- this type of activity is helpful for a child who is hyporesponsive to touch as it requires a light tap or touch in order to play the game. This game also requires movement of the head and body positions and can be helpful for children with under responsiveness in the vestibular and proprioceptive systems.
 - **Play tag** – this type of activity is helpful for a child who is hyporesponsive to touch and has poor vestibular and proprioceptive input, as it requires changes in speed and direction of movement.
 - **Animal Walks** – helps develop motor planning, which is needed for completion of daily tasks such as getting dressed, learning in school, and playing at recess.
 - ✓ Child goes on all fours and “growls” like a bear
 - ✓ Bunny hop
 - ✓ Froggy jumps
 - ✓ Crab walk – Child has tummy facing the ceiling with knees bent and arms holding self up. The child then crawls like a “crab”.

➤ **Craft Activities**

Benefits of Activities: The following activities will help for a child who is hyper and hypo responsive to proprioceptive, vestibular, and tactile input as it can be both **Alerting and Calming**. These activities will also help in learning how to maintain attention as it provides visual stimulation for focusing on the task.

1. Making a Cat Mask

Items needed:

- Paper plate
- 2 Popsicle sticks
- Pipe cleaners
- Markers or crayons for decorating cat face
- Glue
- Scissors
- Pencil

What to do: On a blank paper plate, have the child trace eyes and a mouth for the cat. Use the scissors to cut out the eye and mouth patterns as well as making 2” long whiskers from the pipe cleaners (the child may need assistance with cutting if touch is not adequate). The child is instructed to decorate the cat face using markers or crayons. Decorating ideas may include: drawing in eyelashes, a nose, and deciding the color of the cat mask. Once that is completed, the child can glue the pipe cleaner pieces beside the nose for the “whiskers”. Finally, popsicle sticks are glued on the inside of the paper plate for the child hold up the mask.

2. “It’s all about me”

Items needed:

- Tag board (adequate size to fit height of child)
- Crayons or markers
- Pencil
- Scissors
- Glue
- Old magazines or books

What to do: Instruct the child to lie down onto the tag board and the parent can trace the outline of his/her body using a pencil. Once that is completed, have the child cut the outline of his/her body with the scissors (may need assistance with cutting if child is hyporesponsive to touch). Markers or crayons can be used to draw in facial features, color of clothing, or other items the child wishes to add color. Next, the child can browse through magazine or books pertaining to information or ideas that interest them. Some examples may include: favorite toys, hobbies, certain foods, etc. The child is instructed to cut out the various items and glue them onto the body outline.

Variation: Another suggestion for use of pictures from magazines or books may include:

- Instructing the child to find activities that could be used if demonstrating signs of **hyper or hypo** responsiveness in the tactile, proprioceptive, and vestibular systems. Examples may include: pictures of swings, playing with different textures, or playing with a rope.

➤ Wrap It Up

Benefits of the activity: The deep pressure from the exercise band helps to calm and organize the tactile system and decrease sensory defensiveness.

Items needed: Medium weight, 50 yard length of latex free, stretchy exercise band. This can be purchased through companies such as Sammons Preston and Abilitations. Their contact information is available in Chapter 4.

Preparation: Wrap resistive band around the child like a mummy, from shoulders to ankles. While wrapping, make sure the band is snug but not too tight.

What to do: After being wrapped like a “mummy” the child can walk or roll around on different surfaces.

➤ Hot Dog

Benefits of Activity: The deep pressure from the mat or sleeping bag and other items is calming to the child's proprioceptive and tactile system. Rolling also helps organize the vestibular system and will be of assistance for children with over responsive behaviors.

Items needed:

- Sleeping bag, foam mat, or gym mat
- Optional items may include: washcloth, large paintbrush, and pieces of fabric

Preparation: Put the sleeping bag or mat on the floor or bed. Have the child lie tummy down, with their head off the mat.

What to do: While the child is lying on the mat or sleeping bag, gently roll the sides of the blanket like a "hot dog" around his/her body. The parent can then apply different "condiments" using different touches. For example, spreading on the ketchup may include gentle rubbing techniques using the washcloth or paintbrush from head to toe. Another suggestion is to "add some cheese" which can be completed by placing pieces of fabric onto the blanket. After the child has enough "condiments", grasp the edge of the mat and hold while he/she unrolls.

Variations: Other suggestions for condiments may include pickles, peanut butter, jam, and sauerkraut. In addition, a child could make a "sandwich" which involves the blanket as the bread and could add meat slices using different types of fabrics.

➤ Paw Prints

Benefits of activity: Playing in **different textures** can be an **Alerting** or **Calming** experience for a child with autism who is demonstrating signs of tactile dysfunction.

Item needed:

- Cornstarch
- Two mats (one which is a darker color)

Preparation: Apply a large amount of cornstarch on a mat.

What to do: Have the child remove shoes and socks. Next, they are to cover their hands and feet in cornstarch. Finally, the child can make their “print” onto the dark colored mat.

Variations: Other items such as flour, fingerpaints, pudding, or shaving cream can be used in place of cornstarch. Including alerting scents, such as lemon or peppermint, may be helpful for a child who is hyporesponsive to touch. On the other hand, calming scents such as vanilla and lavender can be used for a child with hyper responsive behaviors. The child may prefer to draw shapes or pictures rather than making “paw prints”. Allow your child to be creative and to enjoy being messy, as this helps with increasing tactile sensations.

➤ **Touch Pool**

Benefits of Activity: Sifting fingers and wiggling toes in different textures can be helpful for a child who is sensory defensive. Playing, identifying, and manipulating objects helps to organize the proprioceptive and vestibular system.

Items needed

- Baby swimming pool
- Beans
- Rice
- Oatmeal
- Foam letters
- Measuring cups
- Little toys

Preparation: Fill swimming pool with the above items. Bury little toys and foam letters in the food.

What to do: At first, the child may seem fearful of touching these objects. Therefore, be patient and encourage him/her to play with the objects first. After the child is comfortable with the objects, he/she can get into the pool and “swim around in the different textures”.

Variations: Instruct the child to walk around the pool and pick objects up with his/her toes. A great learning activity for children with autism can be to incorporate social skills into this activity. For example, a parent could ask the child to find the foam letter “A”. If the child responds to this information and is able to communicate by grabbing the letter, then social skills have been addressed.

➤ **Scoters**

Benefits of the activity: Playing on scooters can strengthen a child’s neck and back muscles, promote eye-hand coordination, and provide the child with deep proprioceptive and vestibular input.

Item needed:

- Scooter board (can be purchased for under \$20.00 from many different retailers such as www.sports-equip-supplies.com/pe/scooter_boards.htm)
- A large and smooth space to scooter on

What to do:

- Play a variety of games while on the scooter (i.e. floor hockey or soccer)
- Have the child or children play racing games
- Play tag

➤ Leap Frog

Benefits of the activity: The jumping required in this activity provides deep pressure to muscles and joints, which gives the child strong proprioceptive input. Leaping and rolling during this activity provide vestibular input and rubbing against different textures provides the child with tactile input.

Items needed:

- A padded landing on the floor “lily pad” (i.e down comforter, mattress, large blankets) Make sure there are many layers of padding for the child
- If you would like to make your own “lily pad”:
 - ✓ Sew two sheets together on three sides, like a large envelope
 - ✓ Fill the sheets with pillows or foam scraps
 - ✓ Sew the fourth side together
 - ✓ If possible sew a zipper onto the sheet so you can wash and refill the “lily pad” when needed.

Preparation: Clear a space in any room of the house. Make sure there are no dangerous objects around that the child could bump into or fall onto.

What to do:

- Have the child leap from the couch, chair, or bed onto the “lily pad” (soft surface)
- Roll the child around in the blankets
- Have the child take a nap on the “lily pad”

➤ **Bag Ball**

Benefits of the activity: The movement and kicking of the child's legs and feet promotes proprioceptive input. Running and kicking can improve a child's balance, motor skills, and using both sides of the body. Playing bag ball with others allows the child to build social skills.

Items needed:

- Paper bags

Preparation: Rip or cut open the paper bags so they are either flat or round like a ball. Have the child remove shoes and socks if safety is not an issue.

What to do:

- Kick the bag high up into the air, and try and kick it higher and higher each time
- Play a version of kick-ball with the child
- If other children are also playing the game make a start and finish line and have all the children kick their bags from one end to the other
- Kick the bag back and forth with a partner

➤ **Weighted Vests**

Benefits: Wearing a weighted vest during movement and activity provides a child input from all three systems (vestibular, tactile, and proprioceptive). Benefits include: calming, decrease rocking, increase attention, increased eye contact and increased body posture.

Preparation: As a parent you have the choice to either buy a vest, or make your own. If you choose to buy a vest there are a variety of different colors, shapes, and sizes you can purchase. There are also a variety of retailers to buy from. One retailer you can purchase a vest from is Sammons Preston (www.sammonspreston.com). However, you may also choose to make your own vest. To make your own vest follow the steps below.

1. Find a vest your child has or purchase a vest for your child
2. Cut the back pockets off two pairs of old jeans
3. Hot glue or sew the pockets onto the child's vest (place two pockets in front and two pockets in back to even out the weight)
4. Place little sandbags or bean bags inside each of the four pockets and either hot glue or sew the pocket shut.

When to wear the vest:

- Depending on your child's needs have him/her wear the vest for at least 30 minutes and up to 2 hours
- When the child is overactive have him/her wear the vest until he/she calms down
- If you child has difficulties eating meals, grocery shopping, going to the mall, or at Sunday school
- Before bedtime: applying the vest 30 minutes before bedtime helps the child calm down and sleep well
- Take breaks: take the vest off the child when he/she needs a break or the vest does not seem to be having an affect anymore

➤ **Flashlight Fun**

Benefits: Having your child in a dark room minimizes visual stimulation and therefore has a calming affect.

Items needed:

- Flashlight
- Relaxation music (can be purchased at Wal-Mart or Target)

Preparations: Find a room in the house where the child feels comfortable and can have a place to relax. Give your child the flashlight and have him/her use his/her imagination and have fun.

What to do:

- Play tag with stuffed animals or other objects in the room (have the child directly shine the light onto an object to tag it)
- Practice spelling words on the ceiling
- Draw shapes on the wall and ceiling
- Listen to relaxing music

➤ **Fidgets and Oral Toys**

Benefits: Allowing the child to fidget with his/her fingers and chew/suck on oral toys can provide many benefits such as: offers the child something more appropriate to chew/fidget with, calming and relaxing, decreasing anxiety, increase visual and fine motor skills, stay focused on a task, and provides proprioceptive input to the child's mouth.

Common items used:

- **Fidgets:**
 - Koosh-balls
 - Small rubber balls
 - Jitter critters (vibrating animals)
 - Squiggle wiggle writer (use when the child is doing homework or other writing tasks)
 - Silly putty
 - Play dough
 - Beanbags
 - Dice
 - Marbles
 - Cotton balls

- **Oral toys:**
 - Bubble gum
 - Hard candy/suckers
 - Chewy tubes
 - Melody pops
 - Popsicles
 - Sweet candy such as licorice (generally have a calming affect)
 - Sour/bitter candy (generally have an alerting affect)

🔗 The fidget and oral toys can be purchased at most grocery and retail stores such as Wal-Mart and Target.

What to do: While the child is doing in an activity/task or needs some calming or alerting input have him/her use one or more of the fidget/oral items listed above.

➤ Swings

Benefits: Provides movement sensations while the child is on the swing. These sensations promote muscle tone, encourage eye-hand coordination, and allow for the child to cross mid-line. Swinging also provides the child with vestibular and tactile input.

Items needed: A suspended swing in your home or any type of swing outdoors. Suspended swings for indoor/outdoor use can be purchased through a variety of retailers such as www.adaptivemall.com/swings.html or toll-free:1-800-371-2778.

What to do:

- Your child can swing in many different positions such as on his/her stomach, back, bottom, and side
- Place cones or objects on the floor and have the child swing around and knock all the objects over
- Roll a large, soft, ball on the ground and have the child try and avoid the ball or have him/her let the ball crash into them (the ball can give the child input and sensations)

➤ Row, Row, Row, Your Boat

Benefits of the activity: The different movements during this activity provide the child with vestibular, tactile and proprioceptive input. The swaying backward, forward, and sideways allows for strong vestibular input.

Items needed:

- Blankets on the floor
- Any household items needed to make a simulated boat

Preparation: Set up a simulated boat with blankets, foam, and any other materials you can find. It makes the activity more fun when you have actual props.

What to do:

- Sit with the child or have other children play along
- Sing to the tune of row, row, row, your boat
- Have the child sway backwards, forwards, and side to side as if he/she was riding in a boat
- Have objects such as fish and pretend to go fishing while in the boat

➤ **Teeter-Totter Time**

Benefits: Playing on a teeter-totter gives your child strong vestibular input and can improve his/her body awareness, motor control, and postural stability. The back and forth motion also stirs up the bodies speech and language centers of the brain, the child may then have improvements with speech and language after a few minutes of teeter-tottering.

Items needed:

- A base: railroad timber, or a 4X4 that is about 1 yard long
- For the top: 1X3 foot board, or a 3X3 piece of plywood
-

Preparation: Place the base section of the teeter-totter on the grass or inside on the floor. Then place the top section on the midpoint of the base.

What you can do:

- Walk back and forth from one end of the teeter-totter to the other
- Sit or stand in the middle of the teeter-totter and rock back and forth

➤ My Little Box

Benefits of activity: One major benefit to this activity is your child is able to calculate how his/her body size relates to the box and its openings. This then can improve your child's proprioception and motor planning.

Items needed:

- Cardboard boxes big enough for you child to crawl into
- Packing tape/duct tape
- Scissors
- Crayons, markers, paint, stickers

Preparation: The box should be a place for your child to play or relax. You can be as creative as you want with the box. Make sure all sharp edges and staples are removed, and then cut out an opening large enough for your child to fit into. Next, have your child help decorate the inside and outside of the box (using markers, pens, paper, paint, ect). You can also place blankets and pillows inside the box to make it cozy. Another idea is to connect several boxes together and make a castle or maze.

What to do: You can use the boxes in many different ways such as:

- Quiet time
- Obstacle course
- Playing make believe, house, school, ect
- Use a flashlight to draw inside the box

➤ Trampoline Time

Benefits of activity: Jumping on a trampoline improves rhythm and helps to regulate a child's nervous system. Jumping also provided proprioceptive, vestibular, and tactile input. Jumping can also help improve motor coordination and stimulates the speech and language part of the brain.

Items needed:

- Mini trampoline can be purchased at Wal-Mart or Target and on the internet
- Large trampolines can be purchased at Wal-Mart, Sams Club or on the internet
- Pillows, cushions, or blankets
- Music to jump along with

Preparation: Place pillows and blanket all around the trampoline to ensure safety. Then gather any other materials you may want to use such as a tape/CD player, music, books, ect. Once you have all the materials gathered you can begin the fun!

What you can do:

- Jump up and down on the trampoline while singing or listening to music
- Place foam or other small objects on the trampoline and play "popcorn" (see how long you can keep the objects bouncing on the trampoline without falling off).

Chapter 4

Parent Resources for children with autism

Abilitations

PO Box 620856

Atlanta, GA 30362

Telephone: Toll Free (800) 845-1535

Local (707) 263-0897

Website: www.abilitations.com

Therapist selected rehabilitation products designed to improve the lives of children with differing abilities and specialized physical needs. Products focus on movement, positioning, sensory-motor activities, exercise, aquatics, and play. The product line includes handwriting materials, mouth toys, visual toys, Mozart tapes, movement gear, weighted vests, therapy balls, and Wilbarger Protocol brushes.

American Occupational Therapy Association, Inc. (AOTA)

4720 Montgomery Lane

Bethesda, MD

Mail: PO Box 31220 Bethesda, MD 20824-1220

Telephone: Toll Free (800) 668-8255

Local (301) 652-AOTA

Website: www.aota.org

Books, videos, continuing education workshops, and other resources for occupational therapists, as well as products for parents, such as a handbook, *Sensory Integration: A Foundation for Development*.

Autism Network for Dietary Intervention (ANDI)

www.autismndi.com

Providing help and support for families using a gluten-free and casein-free diet in the treatment of autism and related developmental disabilities. ANDI was established by parent researchers, Lisa Lewis and Karyn Seroussi. Their books, *Special Diets for Special Kids* and *Unraveling the Mystery of Autism and PDD*, as well as *The ANDI News* quarterly, are available through the website.

Future Horizons

Mail: 721 W. Abram Street, Arlington, TX 76013

Telephone: Toll Free (888) 489-0727

Local (817) 277-0727

Website: www.futurehorizons-autism.com

The world leader in autism/Asperger's syndrome publishing, including books, audios and videos such as *The Out-of-Sync* video. Future Horizons also sponsors conferences throughout the U.S. and around the world, featuring topics such as autism, Asperger's syndrome, sensory issues, early intervention, inclusion, IEPs, social skills, music and art therapy, diet and nutrition, visual thinking, and communication.

Integrations

Mail: P.O. Box 620860, Atlanta, GA 30362

Telephone: Toll Free (800) 622-0638

Website: www.integrationscatalog.com

Unique, user friendly product line for home, therapy, and school settings. The solutions-based format, with information tips written in an educator's language, quickly and concisely conveys information about a child's needs to teachers and school administrators. Products include applications of common sensory input to build individual sensory diets, such as fidgets, metronomes, weighted products, Body sox, trampolines, tunnels, Mozart and other musical selections, unique whistles, and chewies.

Pocket Full of Therapy, Inc.

P.O. Box 174, Morganville, NJ 07751

Telephone: Toll Free (800) 336-5948

Local (732) 441-0404

Website: <http://www.pfot.com>

Therapeutic, fun materials and toys for therapists, teachers, and parents to use to motivate children.

Sammons Preston

P.O. Box 5071, Bolingbrook, IL 60440-5071

Telephone: Toll Free (800) 323-5547

Website: <http://www.sammonspreston.com>

Pediatric therapeutic products (*Tumble Forms*) for bathing, feeding, and dressing, positioning, mobility, motor development, and sensory integration, to use in homes, schools, or clinics.

Sensory Comfort

Mail: P.O. Box 6589, Portsmouth, NH 03803-6589

Telephone: Toll Free (888) 436-2622

Website: www.sensorycomfort.com

Products to make life more comfortable for children and adults who have sensory processing differences. Items include seamless socks, headphones that reduce noise, chewy tubes, fidget toys, wiggle pens, and many other sensory-friendly products for home, school, and work, as well as informational books and cassettes.

Sensory Resources, LLC

Mail: 2200 E. Patrick Lane, Suite 3A, Las Vegas, NV 89119

Telephone: Toll Free (888) 357-5867

Local (702) 433-0404

Website: www.sensoryresources.com

Resources for raising children with sensory-motor, developmental, and social-emotional challenges. The organization publishes and distributes materials

such as *The Out-of-Sync Child* video, *Answers to Questions Teachers Ask About Sensory Integration* reference book, and other books, audiocassettes, and videos. It also sponsors national conferences on sensory integration and related subjects. Sensory Resources has acquired the Belle Curve Records line, including *Songames for Sensory Integration*, *Danceland*, *The Alert Program*, *Making Sense of Sensory Integration*, and *Teachers Ask about Sensory Integration*.

Southpaw Enterprises

109 Webb Street

Dayton, Ohio 45403-1047

Telephone: Toll Free (800) 228-1698

Website: <http://www.southpawenterprises.com>

Equipment used in sensory integration treatment including suspended equipment including hammocks, platform and bolster swings, tactile activities, weighted vests and blankets, therapy balls and other fine and gross motor equipment; books and videos; toys and equipment for use at home and school.

Therapro

225 Arlington, Framingham, MA 01702

Telephone: Toll Free (800) 257-5376

Website: <http://www.theraproducts.com>

Therapeutic equipment and toys, including unique kits and samplers for developing fine motor, visual motor, and oral motor skills. There are also videos on sensory activities that can be used within the home setting.

APPENDIX A

SENSORY CHECKLISTS

The following checklists contain information pertaining to vestibular, tactile, and proprioceptive dysfunction symptoms often times seen in children with autism.

Information included in the checklists is adapted from the following (Kranowitz, 1998; Maurer & Damasio, 1979; Tupper & Klosterman Miesner; Stancliff, 1996). Information from these checklists are a guide to understanding your child’s behaviors. Further evaluation by an occupational therapist or other healthcare provider with a background in sensory integration may be necessary depending on your child’s needs.

❖ **Check all of the following behaviors that your child exhibits**

| Does your child exhibit any of the following under or “hypo” Responsive vestibular behaviors? | YES | NO |
|---|-----|----|
| Spinning in circles an not becoming dizzy/nauseous | | |
| Repeatedly shaking head | | |
| Head banging on objects | | |
| The need to keep moving | | |
| Low attention span | | |
| Enjoys swinging very high | | |
| Uncoordinated and or clumsy (i.e stumble or drop objects occasionally) | | |
| Constantly leaning head on arm/hand | | |
| Easily frustrated | | |
| Touching others around him/her | | |

❖ If you have checked one or more of the following answers yes, your child may be experiencing a **hyporesponsive** vestibular system.

❖ Check all of the following behaviors that your child experiences

| Does your child exhibit any of the following over or “hyper” responsive vestibular behaviors? | YES | NO |
|---|-----|----|
| Intense fear of fast movement | | |
| Easily nauseated or dizzy from small amounts of movement | | |
| Fear of climbing or going down stairs (i.e holds very tightly to the railing) | | |
| Slow moving and cautious | | |
| Dislikes playground activities (i.e. swinging, spinning, and sliding) | | |
| Uncooperative | | |
| Requires continual physical support from trusted adults | | |
| Dislikes having head moved or tilted (i.e shampooing hair) | | |
| Fearful if others move him/her | | |
| Tight, tense grip on objects | | |

❖ If you have checked one or more of the following answers yes, your child may be experiencing a **hyper responsive** vestibular system.

❖ Check all of the following behaviors that your child exhibits

| Does your child exhibit any of the following under or “hypo” responsive tactile behaviors? | YES | NO |
|--|-----|----|
| Unaware of cuts or bruises on body | | |
| Unaware of cold or warm objects on skin | | |
| Excessive touching of objects or people | | |
| Unable to tell the difference between various textures (i.e. smooth vs. rough) | | |
| Have problems manipulating small objects | | |
| Unaware of messiness on his/her face | | |

❖ If you have checked one or more of the following answers yes, your child may be experiencing an **hyporesponsive** tactile system.

❖ Check all of the following behaviors that your child exhibits

| Does your child exhibit any of the following over or “hyper” responsive tactile behaviors? | YES | NO |
|--|-----|----|
| Does not tolerate getting hugs or being touched by others | | |
| Avoids certain textures (i.e. certain blankets, stuffed animals) | | |
| Dislikes touch on hand by glue, paint, or other objects that are wet or dirty | | |
| Picky eater (only likes certain textures of food) | | |
| Dislikes brushing teeth or hair | | |
| Refuses to wear clothes or only like certain types of clothing | | |

❖ If you have checked one of more of the following answers yes, your child may be experiencing an over or **hyper responsive** tactile system.

❖ Check all of the following behaviors that your child exhibits

| Does your child exhibit any of the following under of “hypo” responsive proprioceptive behaviors? | YES | NO |
|---|-----|----|
| Breaks toys or other objects easily | | |
| Appears clumsy (frequently falling or tripping) | | |
| Floppy body movements | | |
| Struggles to open objects (i.e. jars, doors, bottles) | | |
| Uses a very tight grip when holding objects, so tight may break | | |
| Picks up objects with more force, causing the object to fly through the air | | |
| Kick his/her ankles against the floor | | |
| Enjoys proprioceptive input (i.e. playing tug-of-war) | | |
| Poor body awareness | | |

❖ If you have checked one of more of the following answers yes, your child may be experiencing an over or **hyporesponsive** proprioceptive system.

❖ Check all of the following behaviors that your child exhibits

| Does your child exhibit any of the following proprioceptive seeking behaviors? | YES | NO |
|---|-----|----|
| Head banging | | |
| Chewing constantly on shirt collar, fingers, and other objects | | |
| Rubbing hands or cracking knuckles | | |
| Likes jumping on the bed/couch | | |
| Purposefully bumping into furniture or people | | |
| Rocking back and forth | | |
| Appears hyperactive or unsafe | | |
| Likes to squeeze into tight places such as between furniture | | |
| Hides under heavy blankets | | |
| When angry or frustrated does your child push a body part of him/her into other objects or people (i.e pushing his/her chin into objects or people) | | |

❖ If you have checked one of more of the following answers yes, your child may have a **sensory seeking** proprioceptive system.

APPENDIX B

DAILY SCHEDULE

Current literature states that children with autism have difficulty carrying out tasks throughout the day such as getting ready for school, eating, or playing with others. This difficulty in carrying out habits and routines prevents the child from being able to adapt and orient to various stimuli within the environment (Kranowitz, 1998; Ayres, 1979; Trott et al. 1993; Yack et al. 1998). Therefore the following schedule is a tool that can be used to record the child's participation in typical daily activities and the effectiveness of interventions strategies used to achieve a particular goal.

Tracking the Child's Habits and Routines

| | Current habits/routines | What are their goals? | Specific strategies interventions used | The effectiveness of these interventions |
|------------------------------------|-------------------------|-----------------------|--|--|
| Dressing | | | | |
| Washing | | | | |
| Grooming | | | | |
| Brushing teeth/hair | | | | |
| Sleep | | | | |
| Toilet training | | | | |
| Playing with peers | | | | |
| School performance | | | | |
| Socializing with others | | | | |
| Playing patterns with objects/toys | | | | |
| Eating | | | | |

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CHAPTER V

SUMMARY

This educational manual is intended to provide parents with valuable information that can be implemented for their child with autism. There have been numerous studies on the effectiveness of sensory integration techniques and their global use for different types of diagnoses. However, literature relating specifically to autism and benefits of sensory integration are limited. The research that has been conducted presents a strong correlation between deficits seen in tactile, vestibular, and proprioceptive input and the use of sensory integration for children with autism. Based on this research, the authors' completed a parent manual focusing on treatment strategies for these three systems. Occupational Therapists and other health professional may benefit from the use of this manual when treating children with autism. The use of evidence based practice is important when working in the health field as strategies and interventions are evaluated frequently and new research studies can be completed.

The activities and interventions listed in Chapter 4 are suggested activities to help modulate the vestibular, tactile, and proprioceptive systems. It is important to look at each child as their needs may differ. If necessary, adaptations to activities may need to take place. A possible limitation to this project may be that there is less of an emphasis on all the types of activities used for sensory integration dysfunction. However, because the focus was on children with autism, the suggested activities correlated with this population.

Recommendations for future projects may include researching and gathering data about children with autism in a local community. Families of this population could be contacted to take part in a study exploring the patterns and routines of their children. In addition, sensory integration activities could be implemented to determine their efficacy for this population; this should be paired with evidence based research.

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