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Sensory Integration: Parent Education Manual

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Sensory Integration: Parent Education Manual

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This Scholarly Project Paper, submitted by Megan Wosepka in partial fulfillment of the requirement for the Degree of Master’s 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

Dr. Jean Ayres developed the theory of sensory integration (SI), and she defined sensory integration as “the organization of sensory input for use. Through sensory integration, the many parts of the nervous system work together so that a person can interact with the environment effectively and experience appropriate satisfaction.” (Ayres, 1979, p. 184) This theory attempts to explain how sensory processing deficits can lead to learning and behavioral problems children exhibit. Ayres described that SI is the foundation for learning. Ayres called it the “building blocks” (p. 15) of learning to develop more mature activities; sensory integration intervention driving occupational therapy treatment indirectly affects the child’s occupational performance.

Occupational therapists work with individuals throughout the lifespan from infancy through the final years. Occupational therapy interventions are holistic and address the physical, psychosocial, and contextual factors of a disability (AOTA, 2002). The practice setting can be a medical/hospital, home, school, or community program setting. Within each practice setting and depending upon the client diagnosis, there are several different ideas or theories a therapist may use to treat the client.

Occupational therapy focuses on assisting individuals to participate in daily life activities in which they find meaning and purpose; also known as occupations. Occupational therapists’ views are that health and well-being is promoted when an individual is allowed to participate and carry out roles in home, school, work, and community life situations. An occupational therapist helps the individual to function in
these areas by using the skills the client has the ability to perform while addressing the factors that limit and individual’s activity and independence. Occupational therapists also realize that an individual’s experience can only be fully understood when the various contexts of each occupation and daily life activity are taken into account (AOTA, 2002).

A child’s occupational performance is affected by sensory integration dysfunction. The child may demonstrate inappropriate behaviors, volatile emotions, impulsive behaviors, or out of control behaviors; in this case the child, “needs guidance to engage in active, meaningful play” (Kranowitz, 1998, p. 58). On the other hand, a child may be withdrawn into his/her own world and difficult to engage this “child needs help to find safe, appropriate activities that will encourage more organized and purposeful behavior” (p. 59). A child’s primary occupation is play. Some examples of occupations children participate in are, rolling in the grass, licking a popsicle, tying their shoes, playing on the jungle gym, or inspecting a bug. When a child is not able to fully and appropriately participate in the activities of childhood, it is an indication that SI intervention could benefit the child. Occupational therapy should focus sensory integration intervention on play and what the child enjoys.

Most of the information and literature on sensory integration theory and intervention has been written for professionals and parents often have difficulty understanding this type of information. According to Pain (1999), parents feel the need for more information; to enhance the management of the child, to help them cope emotionally, and to assist in the finding of services and benefits available. Cohn (2001)
stated that parents are more accepting of their child if they are able to understand their child’s behaviors caused by sensory perceptions. Children’s self-worth increases when they feel accepted. Hinojosa & Anderson (1991) found that parents comply with home programs they can understand and easily integrate into their daily routines and interactions with their child. Based on the findings stated above, there is a need for materials on sensory integration that are geared toward parents so that they can understand the disorder and take a greater role in the treatment of their child. The purpose of this scholarly project was to develop materials and resources for parents in a handbook format, which can be used under the guidance of the occupational therapist treating the child.

This chapter concludes with definitions of terminology used throughout this document. Chapter II is a review of literature containing background information on sensory integration, sensory integration in occupational therapy, an overview of parents’ role in the treatment process, and the need for parent education materials. Chapter III explains the methodology used to gather the information for the development of the parent handbook. Chapter IV is the parent handbook itself. Chapter V is a summary of information and recommendations for future development and research.

Terminology

**Adaptive Response:** An appropriate successful response to an environmental demand requiring good sensory integration.

**Apraxia:** Difficulty motor planning and completing an action or task unfamiliar to the individual.
Aversive Response: A feeling of dislike and disgust causing the intense desire to avoid or turn away from the sensations most individuals would find non-noxious.

Bilateral Integration: The ability to coordinate and use both sides of the body together to carryout a task.

Central Nervous System: Consists of the brain and spinal cord and controls all activity of the whole nervous system.

Discriminative sense: Ability to distinguish between different stimuli. This is not an innate sense but is developed with time and practice.

Fight or Flight Response: An instinct reaction of aggression or withdrawal from real or perceived danger.

Figure-Ground Perception: Ability to attend to what is important by differentiating between foreground and background forms and objects.

Gravitational Insecurity: Seen as fear of moving or not being upright which does not match the actual danger faced.

Modulation: The process of generating an appropriate graded response to sensations by neither over or under reacting.

Praxis: Ability to figure out, organize, and carry out non-habitual motor tasks.

Proprioceptive System: Receptors in the muscles and joints tell the brain when and how they are contracting or stretching and when and how the joints are bending, extending, or being pulled and compressed. Allows the brain to know where the body and its parts are and how they are moving.

Protective sense: An innate system that alerts then individual to real or potential danger.

Receptors: A cell or group of cells sensitive to a certain type of sensation transform sensations into impulses sent through sensory nerves to spinal cord or brain.

Sensory Defensiveness: Overreaction to one or more of the sensations from the sensory systems.
**Sensory Dysfunction:** Inefficient processing of neurological information received from senses causing problems with learning, development, and behavior.

**Sensory Integration Intervention:** “A technique of occupational therapy, which provides playful, meaningful activities that enhance an individual’s sensory intake and lead to more adaptive functioning in daily life” (Kranowitz, 1998, p. 292).

**Somatodyspraxia:** Poor tactile and proprioceptive processing as well as poor praxis.

**Tactile Defensiveness:** A negative reaction of emotions and behaviors to tactile sensations caused by sensory integrative dysfunction.

**Tactile System:** Sensory system that receives information from receptors primarily in the skin in response to pressure, vibration, movement, temperature, and pain.

**Vestibular System:** Sensory system with receptors in the inner ear that respond to the position of the head in relation to gravity and increased or decreased movement.

These terms have been adopted from works of Karnowitz (1998), Parham & Mailloux (2001), Ayres (1979), and Bundy, Lane, & Murray (2002).
CHAPTER II
REVIEW OF LITERATURE

The purpose of this project is to develop a set of parent education materials covering the topic of sensory integration (SI) intervention. It is intended that the materials will be used by an occupational therapist to facilitate parental involvement and understanding when they have a child who is being treated for sensory integration disorders. In order to have credibility, the information included in the parent education materials must be based on current research and literature. This chapter is divided into four sections. The first section is an overview of SI including definitions and terms related to the practice of SI. The second section gives an overview of SI within the practice of occupational therapy. The next section addresses the parents’ role in the treatment process. This section includes information on parental involvement, understanding, and compliance with treatment. It also describes the impact of a child with a disability and the treatment process on the family. The chapter concludes with a review of literature that supports the need for parent education materials that are presented at their level.

Overview of Sensory Integration

Reisman and Hanschu (1992) pointed out that SI is difficult to understand because we cannot see the damage to the central nervous system. The authors attempted to simplify SI to a level most can understand by initially explaining that the central nervous system (CNS) is a huge processing center where information comes in as sensory input.
The output is a feeling, thought, or motor response. As individuals go through their day, a variety of sensations are flooding their central nervous system. Some of these sensations catch people’s attention; a baby crying in the waiting room or flashing lights on the road ahead. Other sensations are left unnoticed: the weight of clothes on their bodies, the sound of someone breathing, or the different textures between applesauce and a hamburger. People respond to some of the sensations they notice and others are ignored. For example, a person may slow down for the lights on the road ahead but chose not to respond to the baby crying. Managing all of these sensations is the job of the central nervous system and more specifically the sensory integrative system. If the sensory integrative system is intact, the individual responds to the sensations with an appropriate response; this response is called an adaptive response. If the sensory integrative system is not functioning, the sensations get jumbled and the person may experience either hyper or hypo responsiveness. Kranowitz (1998) wrote that this jumbling of sensations in the sensory integrative processing system “affects children’s behavior, influencing the way they learn, move, relate to others, and feel about themselves” (p.3).

**Definition**

Ayres (1964) hypothesized that dysfunction in skilled movement such as grasp and release could possibly be related to the developmental process of the central nervous system. The ideas for her proposed theoretical scheme came largely from a research study performed at the University of Southern California. The statistical data gathered lead her to suggest, “the existence of five major syndromes of perceptual motor dysfunction” (p. 222). These syndromes or factors included apraxia, form and position in
space, integration of the two sides of the body, visual figure-ground, and tactile defensiveness. Ayres also hypothesized that a disordered tactile system affects finger movements, and “the continuous flow of tactile sensations, if meaningful, lay down in the brain the body scheme upon which all future motor planning is based” (p. 223). She also, “strongly suggested, however, that treatment based primarily on influencing basic neurophysiological integration, through control of sensorimotor behavior, and secondarily on intellectual processes will be the most effective approach” (p. 225). Primarily this is the definition we use today for SI.

Ayres (1979) continued working with neurologically disabled children. These children had no damage to their nervous systems. The nervous systems were disabled, meaning that a neurologist would find nothing wrong with the CNS of these individuals, it is not a disease and it is not going to get worse, however it will affect the individual more at different times of their life. In the neurologically disabled, Ayres found a pattern of individual children and adults who were unable to complete a seemingly simple task or to pay attention. Ayres continued to look at how the brain processes sensation in all body parts not just the eyes and ears for answers. It was found that in some cases the brain did not have the capacity to process all of the information coming in as sensations. Thus, Ayres defined SI as

The organization of sensory input for use. The “use” of may be a perception of the body or the world, or an adaptive response, or learning process, or the development of some neural function. Through sensory integration, the many parts of the nervous system work together so that a person can interact with the environment effectively and experience appropriate satisfaction. (p. 184)

is the amount of sensory stimulation needed for a system to respond, and behavioral response is an individual’s reaction when the threshold is met. How sensory information is processed in individuals can be seen when these two components interact. Using this information Bundy et al. (2002) noted that SI is used to explain behaviors, plan interventions, and predict change in behaviors. The authors described three components to SI. The first is that learning is based on the body’s capability to take in and process sensory information from movement and the environment, and then use the information to plan and sort out behavior. Secondly individuals have a decreased ability to produce appropriate actions when they are not able to process sensory information adequately. Lastly, “enhanced sensation, as a part of meaningful activity that yields an adaptive interaction, improves the ability to process sensation thereby enhancing learning and behavior” (p. 5).

**Sensory Systems**

Ayres (1979) referred to the senses as “nourishment” for the CNS. Without this nourishment the CNS is unable to develop and function in the way it should. She separated the senses into two groups. The first being the senses individuals use to be more aware of their surroundings, including; sight, sound, smell, and taste. The second group consisted of senses people do not always realize “because they are processed semi-consciously in the brain” (p. 33). Arkwright (1998) then took these “semi-conscious” senses and explained them as systems: the proprioceptive system, the tactile system, and the vestibular system.

The proprioceptive system gathers information from receptors in the muscles and joints. The information is sent to the cerebral cortex where it is integrated with other
input and the body understands where it is in space and how the parts are moving. When the proprioceptive system is processing information appropriately, the individual has as the ability to “develop smooth coordinated movements” (Arkwright, 1998, p. 11). If the proprioceptive system is not functioning correctly the child may have trouble with fine and gross motor movements. They may be unable to gage their grip strength and squeeze fruit until it smashes or breaks their pencils. Some children are unable to position their body correctly to start an activity such as kicking a ball and once participating in the activity they may have difficulty changing position such as moving right or left to catch a ball. Children with proprioceptive dysfunction may need to look to see what they are doing and often bump into things, looking clumsy.

Ayres (1979) explained that tactile system sends information from receptors of touch, pressure, pain, texture, heat or cold, and movement of the hairs on the skin to the brain. Arkwright (1998) further explained the responses to these senses as discriminative or protective. Discriminative tells the body where and what is being touched. For example; feeling vibration, light touch, pressure, or identifying an object only by touch (stereognosis) triggers anticipation of incoming sensory information. Protection is in the response to danger. The body identifies something wrong from pain, temperature, and basic touch triggering strong emotions and/or a flight or fight response. These two types of touches must be balanced in order for the individual to react appropriately to tactile input. A child with hyperactive tactile dysfunction my dislike brushing teeth, not like the feel of some clothes or tags, not like sand, finger paint, or grass, dislike crowds, avoid messy situations, avoid certain textures, be a picky eater, and become aggressive when a
touch is registered as a threat. On the other hand, a child with hypoactive tactile dysfunction may not react to pain and craves to be held and touched (Arkwright, 1998).

The vestibular system tells the body whether it is moving or standing still, what direction it is moving in, and where it is with regard to gravity. With this information muscle tone and posture are maintained, the visual field is adjusted to compensate for movement of the head or body, and both sides of the body can work together. This is the sense of balance. The receptors for this sense are located in the inner ear. There are two structures related to the sense of balance, the vestibule responding to straight line movements (static equilibrium) and the semi-circular canals responding to spinning or diagonal movements (dynamic equilibrium). The receptors from the inner ear send information to the brain to be processed. After processing the information sent to the brain from the inner ear receptors, motor commands are sent to eyes and body for reflexive movements and information is sent to cerebral cortex to give perception of space and orientation in space. A child who gets car sick, dislikes carnival rides, is scared to lean over backwards, roll in a barrel, or swing is showing signs of a hyperactive vestibular system or gravitational insecurity. A child who stumbles or falls a lot, has trouble performing activities requiring both sides of the body, does not try to catch himself when falling, loves fast and moving equipment, does not get dizzy, and confuses their right and left is showing signs of a hypoactive vestibular system (Arkwright, 1998).

Sensory Dysfunction

There are several diagnoses SI is commonly associated with, but there is also the diagnosis of sensory dysfunction which may be a primary or secondary diagnosis. Sensory dysfunction may have several indicators that exhibit themselves as “difficulty
with CNS processing of sensations” (Bundy et al., 2002, p. 479). Yack, Aquilla, and Sutton (2002) expressed that the CNS may have difficulty processing sensory information because of abnormal development of the nervous system or defective transmission of information in the nervous system. The indicators in which sensory dysfunction are manifested include poor praxis, and modulation, and deficits in bilateral integration, posture, sequencing, visual motor, perception, and somatodyspraxia (difficulty with both easy and difficult fine and gross motor tasks). Also included is gravitational insecurity, aversive response to movement, and over or under responsiveness to stimuli (Bundy et al., 2002).

**Sensory Modulation**

Ayres (1979) stated there will be an adaptive response when sensory needs of a child are met and all sensory information is organized. Bundy et al. (2002) stated the child will function appropriately in their environment. If they are unable to modulate information, particularly vestibular, proprioceptive, and tactile coming into their body, children may be either hypersensitive or hyposensitive to stimuli. Kranowitz (1998) provided a vivid description of the difference seen between a child with normal SI and a child with SI dysfunction.

*A child with normal SI*

During recess, Susan, seven plays jacks. She ignores the cold pavement because the game interests her. However, her hands are cold, too, so she doesn’t play well. The first time she fails to scoop up the jacks, she’s disappointed. The second time, she’s thoroughly frustrated. She stands up and says, “I’m going to jump rope.” Jumping rope for a few minutes warms her up and calms her. After recess, Susan returns to her classroom and is attentive until lunchtime. (p. 45)
A child with SI Dysfunction
Beth, seven, is playing jacks. She can’t concentrate because the cold pavement distracts her. On her first two turns, she has trouble scooping up the jacks. Beth tries again, but her hands are too stiff. Suddenly, she explodes and screams, “I hate jacks!” She jumps to her feet, kicks the jacks into the grass, and leans against the building, crying uncontrollably. Unhappy for the rest of the morning, she can’t calm down to attend to the reading lesson, and she refused to eat lunch. (p.45)

Arkwright (1998) considered hypersensitivity as the CNS being hyperactive or overactive and hyposensitivity as the CNS being underreactive or hyporeactive. Parham and Mailloux (2001) referred to hypersensitivity as sensory defensiveness; this includes tactile defensiveness, gravitational insecurity, and defensiveness to other sensory input. Hypersensitivity causes a child to overreact to sensory stimuli. These reactions demonstrate themselves in some children as inappropriate behaviors, volatile emotions, impulsive behaviors, or out of control behaviors. The child, “needs guidance to engage in active, meaningful play” (Kranowitz, 1998, p. 58). Parham and Mailloux (2001) stated hyposensitivity is considered a problem with sensory registration. This includes registering sensory information less intensely than normal, if at all, and/or registering the information but not responding to it. According to Kranowitz (1998) a child who is hyposensitive may perceive they are not getting enough sensory information thus seek stimulation to achieve normal alertness. They may touch everything, bump and crash into walls, or chew on various objects seeking extra stimulation. On the other hand, the author pointed out the child could be withdrawn into his/her own world and difficult to engage. This child tires easily and cannot seem to initiate activities. “The child needs help to find safe, appropriate activities that will encourage more organized and purposeful behavior” (p. 59).
Sensory Integration as a Secondary Diagnosis

Parham and Mailloux (2001) explained sensory integrative disorder (sensory dysfunction) as not one definite problem but a group of different disorders that involve a multisensory system. These sensory disorders affecting human behavior are difficult to detect with an untrained eye but are underlying factors to behaviors seen in some children. Some of the common diagnoses sensory integrative disorder is associated with are attention deficit hyperactivity disorder (ADHD), learning disorders, fragile X syndrome, Down syndrome, and pervasive developmental disorders including, autistic disorder, Rett’s disorder, childhood disintegrative disorder, Asperger’s disorder, and pervasive developmental disorder – not otherwise specified. It was also noted by Berry and Ryan (2002) that sensory integration intervention is used in situations where neurological damage is not present. Therefore children with cerebral palsy are not diagnosed as having sensory dysfunction because there is always some level of neurological damage. However these children and children with other neurological diagnoses may have difficulty modulating sensory information, thus, having sensory dysfunction as a secondary diagnosis.

Sensory Integration in Occupational Therapy

It was estimated by Ayres (1979) that 5-10% of “normal” children experience SI problems at a level that requires intervention. However more recently Yack et al. (2002) found there are no definite numbers as to how many children are affected by SI dysfunction. When a child is not able to fully participate in the activities of childhood, it is an indication that SI intervention could benefit the child.
Sensory Integration as an Occupation

There are various intervention techniques that can be used with children who do not respond appropriately. Ayres (1979) stated that these interventions should be occupation based; a child’s primary occupation is play. Some examples of occupations children participate in are, rolling in the grass, licking a popsicle, tying their shoes, playing on the jungle gym, or inspecting a bug. Therefore, occupational therapy should focus sensory integration intervention on play and what the child enjoys. Ayres suggested the child should direct the therapy so that later in life he will be able to control himself:

Most education is externally directed, and probably needs to be that way most of the time. But children also need to develop inner direction in their relationships with the physical environment and other people. Self confidence is based on the ability to direct oneself. (p. 150)

The author also noted that many children with sensory integration problems see themselves as different from peers; they may feel inferior, and have a sense of failure. Helping a child “direct oneself” through play, and choice during therapy in a fun environment inevitably becomes occupation based and the child is excited to return to therapy.

Ayres (1979) defined four levels of SI development; mastery at each level facilitates the child’s ability to perform certain life functions. Mastery at each level requires all senses to function adequately. The levels start with all major sensory systems requiring adequate stimulation and flow of impulses from the receptors to the brain. The primary level includes the integration of the tactile system where all information from every inch of skin comes together for the functions of sucking, eating, mother-infant bond, and tactile comfort. An infant must interpret the tactile sensations appropriately in
order for him/her to form an emotional attachment to their caregiver. In this same level vestibular and proprioceptive sensations are integrated to develop the functions of eye movements, posture, balance, muscle tone, gravitational security.

According to Ayres (1979), the second level is achieved when the proprioceptive, vestibular, and tactile systems are integrated. From the integration of these systems, body perception, bilateral integration, motor planning, attention span, and emotional stability are developed. Vision and auditory senses are not as significant in this level to develop the functions stated above. The visual and auditory senses enter the picture in the third level. At the third level auditory and vestibular sensations combine for the child to speak and understand language. In this level visual input integrated with vestibular, proprioceptive, and tactile input are integrated in order to allow the child to form hand eye coordination, visual perception, and perform functions that are more purpose driven for example using utensils to eat, drawing, building things and taking them apart. In the last and forth level “everything comes together to form the functions of the whole brain” (Ayres, p. 61).

Ayres (1979) wrote that, the fourth level contains all of the senses which develop into concentration, organization, self-esteem, self-control, self confidence, academic learning ability, abstract reasoning, and brain/body specialization, which are the end products of the process of the first three levels (pp. 59-61). All components of each level do not need to be completed in order to move on to the next level of development and the functions do not develop at one specific age they are a process of sensory integration throughout childhood. The outcomes do not just appear in every human; they are the result of all of the years of development and integration of the brain together. The author
gave the example, “the child learns the same things over and over again, first in crawling, then in walking, then in riding a bicycle” (p. 61). The ability to interact with their environment and perform occupations increases with each level. Therefore SI is the foundation for learning, Ayres called it the “building blocks” (p. 15) of leaning to develop more mature activities; sensory integration driving occupational therapy treatment indirectly affects the child’s occupational performance.

**Therapists Using SI in Practice**

Occupational therapists use sensory integration theory in assessment and intervention in their practice settings. Yack (1989) surveyed the use of SI intervention in the clinical setting using a 22-item multiple choice questionnaire. The survey was sent out to 47 occupational therapists in southern Ontario; 40 female therapists returned the completed survey. The respondents were to be providing services to school aged children with sensory integrative dysfunction, having normal intelligence, and no neurological disorders. The majority of the questions were aimed at finding out what the assessment and treatment strategies were of occupational therapists using SI programs for children with SI dysfunction (p. 231). It was found that the respondents used a variety of direct and indirect services for both assessment and treatment techniques. Sensory Integration was also found to be the, “most frequently identified form of intervention utilized” (p. 232). However the respondents pointed out that a wide range of treatment techniques are used in order to meet the individual goals of their clients (p. 233).

Berry and Ryan (2002) found similar results when they explored what, why, and how pediatric frames of reference are used by occupational therapists in the United Kingdom to provide intervention for children with cerebral palsy. A self administered
questionnaire was given to random sample of 120 pediatric occupational therapists. Of the 120 therapists selected 67.5% practice in non-hospital community settings and 39.2% replied SI is a direct treatment approach and 40% reported that they used SI indirectly. The main reason, identified by the therapists, that SI is used is that the therapists felt sensory integration treatment suited the needs of their client population (p. 422).

Parent Role in Sensory Integration

Parents play a major role; they must understand the sensory integration treatment and be willing to implement some ideas into the child’s and family’s daily routine.

*Parent Understanding and Involvement*

The parent plays a major role in this intervention process. Cohn & Cermak (1998) conducted a study to look at possible measures that impact the sensory integration intervention and its relationship between child and parent. The authors found that as parental understanding of their children and how they function on a different level increases parental stress with SI interventions decreases. Parents are confused, anxious, and want answers before they find that SI treatment is an option.

Participants in a study by Cohn (2001) stated that they were looking for a “cure” to fix their child’s problems, but later realized it is not a cure that needs to take place but a greater understanding of their child and how they function differently from other children. The researcher found that participants who had a positive outlook on occupational therapy perceived positive changes in their child’s functioning in the areas of abilities, activities, and sense of self worth. The parents who questioned the benefits of occupational therapy did not notice changes in their child related to a broader social world. Parents reported that the most significant change was when they began to view
the possibility that their child “could succeed in the social world in which they live, work, and play” (p. 288).

Information seeking is seen as a positive coping strategy when dealing with a child who has a disability. Professionals were found by Pain (1999) to be the number one source for parents to gain information on their child with disabilities. Communication was the most common medium for information delivery; although parents with a higher level of education dismissed oral information and did not act on it as well as other parents. The author noted that parents need information on an ongoing basis in order to have sufficient knowledge of their child’s disabilities and feel more in control of their family’s life. Parents valued the ability to contact professionals personally to obtain timely and appropriate information. When parents do not seek information about their child, it may be that they do not know where to begin or what questions to ask. Pain stressed that all parents need to know about their child’s disability and what is recommended as best for the child and family life. “The obligation lies with health professionals to convey that information in a way the parent can understand” (p. 310).

Cohn and Cermak (1998) reviewed literature/research focusing on sensory integration and the outcomes. They explained a conceptual framework for outcomes research and the lack of sensory integration studies proving efficacy. They gave an example of research methodology that can be used to examine outcomes, examples, and a description of potential sensory integration assessment tools to be used for outcomes research. A possible outcome of sensory integration treatment included decreased stress in the parent-child relationship. The authors pointed out that the overall goal of sensory integration treatment is to improve the child’s ability to function in their environment.
Most children’s environments are structured by caregivers or adults; thus education for parents must be provided in order to help them maintain a healthy environment for their child. It is assumed that providing direct treatment to the child and education to the caregiver will result in an overall positive effect on the entire family system. A child will be better able to perform roles assigned to him/her with improved organizational behavior responses.

**Parent Compliance**

Tetreaut, Parrot, & Trahan, (2003) conducted a study on home activity programs not specific to sensory integration, and the compliance of parents with them. The result showed a high level of compliance; 31 of 41 families were still using the home activity program given to them by the therapist after seven months. It was found that parents were more willing to comply for longer with more support from the therapist. On the other hand, Hinojosa and Anderson (1991) completed a study focusing on the mothers’ perception of home treatment programs. The participants of the study were eight mothers; each had a preschool child with cerebral palsy who had been treated by therapists for at least one year. The authors found that two out of the eight mothers interviewed about their participation in home treatment programs complied with the programs but subsequently had to stop because of responsibilities to other children. The other six mothers did not participate in home programs because they found them too time consuming, or too difficult and frustrating.

Hinojosa and Anderson (1991) identified four reasons why parents fail to comply with home treatment programs: 1) mothers had other family responsibilities, 2) found it too time consuming stating, “She would give me an incredible amount of work to do with
the children…There was no physical human way I could do it…with the children” (p. 275), 3) others found it too difficult to participate, 4) developed their own programs based on what they felt their child’s needs were. When the parents adapted the activities, four factors for this were identified by the authors. The activities were: easily integrated into daily routines, did not interrupt family home life, the mother saw them as beneficial to their child, and they could be completed in combination with other home activities. However, the authors pointed out the home programs that are adapted by mothers could also be “therapeutic, functional, and practical” (p. 277). Mothers complied more often with the programs they could easily integrate into their daily routines and interactions with their child.

In the study by Tetreaut et al. (2003) all of the mothers stated they felt inadequate to be treating their child through the formal programs. Along with the noncompliance of the home program activities the parents also did not follow simple advice or reminders based on caring for their child. For example, a therapist gave the parents hints on how to feed their child making sure the child’s head was not extended back, but when asked the parents remembered the hints but were not implementing the ideas.

Tetreaut et al. (2003) and Hinojosa and Anderson (1991) made suggestions as to what the therapist should keep in mind when developing a home activity program. Parents’ input on a targeted outcome should be sought out so that the therapist’s goal is the same at the parent. This should be followed by collaboration in developing the programs. The therapist should demonstrate and teach the home program activities before sending the family home, thus making sure there are no questions. The therapist can view the parents’ way of performing home activities and give positive feedback and
support. Social activities of the family should not have to be changed because of needing
to find time for a home activity program, and follow-up in the home environment is
suggested. It is also important to understand what parents are expecting from therapy and
how they are processing what is happening in and as a result of therapy.

The results of a study by Kirk (2001) that was based on negotiating the roles
between parents and professional, “in the care of children with complex health care
needs” (p. 593) indicated that parents feel obligated to assume responsibilities usually
performed by healthcare professionals, and there is a lack of community resources from
professionals to take on the responsibilities. The author noted the suggested activities
should be enjoyable for the child and easily integrated into the family’s daily schedule.

Overall a parent’s participation in the treatment process is crucial for the
advancement of their child. The involvement fosters positive parent-child interaction,
and an understanding of the child and their disability.

*Impact of Disability on Family*

Implementing home programs, caring for a child with disabilities, and caring for
the rest of the family is a full time job. Pain (1999) explored the parent’s perspective on
coping with a child who has a disability. The researcher conducted 15 semi-structured
interviews with the parents of children with physical or learning disabilities. The
questions asked were based on what information they were given from professionals
about their child’s disability and if the information was helpful. After the interviews
were completed, the author found that all parents indicated they felt a need for more
information either currently or in the past. There were three reasons parents felt a need
for more information: to enhance the management of the child, to help them cope
emotionally, and to assist in the finding of services and benefits available. It was found by Russell (2003) that when overwhelmed by the information about their child’s disability, a parent tends to become dependent, passive, and/or feel a loss of control rather than becoming a proactive partner in their child’s care and education.

Weatherston, Ribaudo, and Glovak (2002) explained the feelings of one mother dealing with a child having sensory integration difficulties. The mother felt trapped in her house because her son could not handle the stimulation of being in public places. She was grateful to have someone to come to her home, the home therapist, to talk to who did not think her son’s problems were unimportant. She appreciated the fact that the therapist was willing to talk with her about her son’s problems. As a professional the expectations of parents should be sought out. Russell (2003) stated that if the parent is not offering ideas and expectations freely and independently the therapist should ask directly. The lines of communication should stay open in order for trust to grow and the child to receive superior care and education.

In order to better understand the impact of having a child with a disability on parents, Brett (2004) completed a phenomenological study looking at how parents explored and accepted support in dealing with their profoundly disabled child. Parents knew that the journey of caring for a child with a disability was difficult but they never viewed it as a burden. When parents were questioning their ability to care for a child with a disability, they often had feelings of anxiety, uncertainty, and distress. Russell (2003) indicted it is important for parents to explore the feelings of sadness they have in order for them to better recognize and meet their child’s needs. Brett (2004) noted that when the decision of needing support from an outside source had become clear to the
parents they may have seen this as a loss. What they once took pride in and contributed to part of their day, caring for their child, was now no longer all their responsibility. The author also noted that parents must understand that they still have control over the care of their child, and by giving in and accepting support they were actually gaining control of the situation. Overall professionals must keep in mind what parents are experiencing and be flexible, “listen, learn, develop and deliver support in ways that are helpful” (p. 18).

In conclusion, parents seek information on the interventions used in their child’s treatment and are willing to participate. Their child’s outcome is interrelated to the parents understanding of their sensory dysfunction. However, parents become overwhelmed easily when working with professionals and their demands. Sensory Integration Theory information should be available to parents at their level so as not to be overwhelming.
CHAPTER III

The methodology used to gather the information for the development of the parent handbook included a review of the current literature and research on sensory integration and discussions with therapists who are currently using sensory integration intervention techniques with children who have sensory processing disorders.

From the literature, it was found that parents are more accepting of their child if they are able to understand the sensory development of their child and why the child is reacting to the different situation in the way they do (Cohn, 2001). Parents comply with home programs they can understand and easily integrate into their daily routines, roles, and interactions with their child (Hinojosa & Anderson, 1991), and parents feel the need for more information. This includes information to enhance the management of the child, to help them cope emotionally, and to assist in the finding of services and benefits available (Pain, 1999).

These significant findings guided the development of the parent education manual. The information presented in the manual should be easily understood by parents; there are sections focusing on the parental roles at school, at home, and in therapy; activity ideas, information on how parents can deal with the child’s emotions, and resources for parents.
CHAPTER IV

The development of this product was based on the literature indicating that: parents feel the need for more information manage the child, to help them cope emotionally, and to assist in the finding of services available (Pain, 1999); parents are more accepting of their child if they are able to understand the sensory development of their child (Cohn, 2001); and parents comply with home programs they can understand and easily integrate into their daily routines, roles, and interactions with their child (Hinojosa & Anderson, 1991).

The Sensory Integration: Parent Education Handbook contains information that should help parents understand what sensory integration is, including: the anatomy of the nervous system, the senses, sensory systems, what treatment sessions will consist of, and what the parent role in the treatment process is. The handbook also contains possible symptoms, sensory integration intervention techniques, and ideas for the parents to use at home under the direction of an occupational therapist.
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INTRODUCTION

Dr. Jean Ayres developed the theory of sensory integration, and she defined sensory integration as “the organization of sensory input for use. Through sensory integration, the many parts of the nervous system work together so that a person can interact with the environment effectively and experience appropriate satisfaction” (Ayres, 1979, p. 184). This theory attempts to explain how sensory processing deficits can lead to learning and behavioral problems children exhibit. Most of the information and literature on sensory integration theory and intervention has been written for professionals, and parents often have difficulty understanding this type of information. There is a need for materials on sensory integration that are geared toward parents so that they may understand the disorder and take a greater role in the treatment of their child. The purpose of this parent education manual is to provide materials and resources for parents in a handbook format that can be used by occupational therapists.

The method in which information was gathered for the development of this parent handbook included a review of the current literature and research on sensory integration and discussions with therapists who are currently using sensory integration intervention techniques with children who have sensory processing disorders. This
handbook contains information that should help parents understand what sensory integration is, including: the anatomy of the nervous system, the senses, sensory systems, what treatment sessions will consist of, and what the parent role in the treatment process is. The handbook also contains possible symptoms, sensory integration intervention techniques, and ideas for the parents to use at home under the direction of an occupational therapist.
OCCUPATIONAL THERAPY

Occupational therapy is defined by the American Occupational Therapy Association in the following way:

Occupational therapy is the use of purposeful activity or interventions designed to achieve functional outcomes which promote health, prevent injury or disability and which develop, improve, sustain, or restore the highest possible level of independence of any individual who has an injury, illness, cognitive impairment, psychosocial dysfunction, mental illness, developmental or learning disability, or other disorder or condition (AOTA, Inc., 1994, p. 1072).

Occupational therapy focuses on assisting individuals to participate in daily life activities in which they find meaning and purpose; also known as occupations. Occupational therapists’ views are that health and well-being is promoted when an individual is allowed to participate and carry out roles in home, school, work, and community life situations. An occupational therapist helps the individual to function in these areas by using the skills the client has the ability to perform while addressing the factors that limit and individual’s activity and independence. Occupational therapists also realize that an individual’s experience can only be fully understood when the various contexts of each occupation and daily life activity are taken into account. The most common form of delivery is direct service to the client. However, occupational therapists are using a group model seen at an organization or community level. In this case, the occupational
therapist uses the consultation and education models of intervention (AOTA, 2002).

Occupational therapists work with individuals throughout the lifespan from infancy through the final years. Occupational therapy interventions are holistic and address the physical, psychosocial, and contextual factors of a disability (AOTA, 2002). The practice setting can be a medical/hospital, home, school, or community program setting. Within each practice setting and depending upon the client diagnosis, there are several different ideas or theories a therapist may use to treat the client.

For a client with physical disabilities, an occupational therapist will address the client’s current level of functioning to determine what factors are limiting their ability to independently carry out the activities that lead to participation in occupation. Because of the holistic approach, the psychosocial aspect of an individual dealing with a physical disability is also addressed. The occupational therapist also takes into consideration the contextual factors that will have an impact on an individual’s ability to function independently. The interventions used may include teaching new skills, remediation of skills that are emerging but not functional, adapting an activity or environment, and/or compensating for the loss of a function. As with the client with a physical disability, the occupational therapist will address the client’s
current level of function and determine what psychosocial factors are limiting the client’s to fully participate in occupational activities when the individual has a psychosocial/mental illness diagnosis. The therapist may teach the client new skills to incorporate into their daily life such as anger, stress and time management; or coping skills. These skills allow the client to function better with others in their family and community.

Pediatric occupational therapists address both physical disabilities and psychosocial disabilities with children. An occupational therapist working with young children will focus on the play of a child and how they interact with others in a variety of settings. As the child matures the transitions is made from play to school. More time is spent with education in this point of the child’s development. The therapist may help the child to become independent in activities of daily living (ADL), mobility, and participating and interacting with others in a socially appropriate manner.

For every individual served by an OT, a plan is developed for the intervention process. The therapist develops this in coordination with the client and/or their family taking into account their priorities and goals. The interventions are then “carried out to address performance skills, patterns, context or contexts, activity demands, and client factors that are hindering performance” (AOTA, 2002, p. 617). All
interventions are directed at a goal or outcome of participation in occupations. These outcomes vary depending on the individual (AOTA, 2002).

As stated in the *Occupational Therapy Practice Framework*, occupational therapists believe that “health and well-being are holistic and they are developed and maintained through active engagement in occupation” (AOTA, 2002, p. 619).
NERVOUS SYSTEM

The nervous system controls all of the functions of the body and it is made up of three parts. The first part is the peripheral nervous system controls which the organs and muscles including eyes, ears, and limbs. The second part is the autonomic nervous system. This controls the functions of the body we don’t think about such as heart rate, breathing, digestion, and reflexes. The third and last part is the central nervous system (CNS). This part consists of the brain and spinal cord. The brain receives sensory information from the body receptors through the spinal cord and responds accordingly with a motor message back to the parts of the body through the spinal cord (Yack, Aquilla, & Sutton, 2002). The brain is like a personal computer which networks information from different parts of the body, brings all of the information together and then directs it out again with an appropriate motor response. Ayres (1979) defined this appropriate response as an adapted response. Ayres also noted the brain should be gaining nourishment from the senses in order to grow and learn. For example, you place your finger on a hot stove, the nerves in the end of your finger relay this message through the peripheral nerves and then up the spinal cord to the brain, the brain processes the sensory information coming to the conclusion that this surface is hot; the brain then sends an adaptive response in the form of a motor
message back down the spinal cord to the muscles of the finger telling it to move away from the hot surface. All of this happens in a split second when the central nervous system is functioning properly. If the message is interrupted at any point in the relaying process, the finger will not move and consequently be burned. An adaptive response was not formed; the brain was not organizing the sensations appropriately and the body was not able to learn and increase efficiency from this incident.
THE SENSES

The senses give an individual information about what is happening outside the body, the warmth of the sun or the softness of the grass, and what is happening inside the body, feeling hungry, safe, or bored. When an individual is feeling bored with the activity they are doing sometimes they look for something more challenging. For example when a child is playing catch with a friend may get bored and change the activity by throwing the ball differently to make catching it more of a challenge. When the senses work together, the body feels satisfied and the brain has nourishment. It can be considered a job well done (Yack, et al., 2002).

There are actually two types of senses. The far senses are those senses a person thinks of when asked about the senses: taste, smell, seeing, hearing and touch; these are the senses an individual is most aware of. An individual can see the difference between colors or hear a dog versus a cat. As the body develops, the far senses develop as well to allow an individual to interact with the environment (Kranowitz, 1998).

The other type is the near senses; these senses are more hidden then the far senses. This is because a person is not aware they are being processed by the brain and cannot control or observe them. However these senses are essential to survival because they respond
to what is happening within the body. These senses are considered sensory systems. The sensory systems are the Proprioceptive System, the Vestibular System, and the Tactile System (Kranowitz, 1998).

- The proprioceptive system – processes information about the body’s position and its parts from receptors in the muscles, ligaments, and joints.
- The vestibular system – processes information about movement, gravity, and balance which comes from receptors in the inner ear.
- The tactile system – processes information about touch and being touched from the receptors primarily in the skin.
SENSORY INTEGRATION

Jean Ayres, the original contributor to the information we have on sensory integration, developed the theory in the 1960’s and on into the 70’s. She referred to sensory integration as, “the ability to synthesize, organize, and process incoming sensory information received from the body and the environment to produce purposeful goal directed responses” (Arkwright, 1998, p.1). Ayres was interested in explaining why certain characteristics were shown in children with mild to moderate learning or behavioral problems. By observing these children she concluded that these children were able to receive sensory stimulation through the sensory receptors, but were unable to process and integrate the sensations correctly. For example, if a child is on the merry-go-round and feels dizzy and sick an appropriate response would be to get off, but the child who does not register that the spinning movement is making him dizzy and sick, he is not processing and integrating the input appropriately. This would be an inappropriate adaptive response (Arkwright, 1998).

All of the sensations described in the previous section are continuously entering the body and being processed by the brain. The brain must then, in turn, organize all of the sensations in order to learn and respond normally. This is more simply stated as sensory integration (SI). When the brain is not able to process and organize
the sensations received it is called sensory integrative dysfunction, sensory integration disorder, or SI dysfunction (Arkwright, 1998).

**Development**

Ayres (1979) defined four levels of SI development. Mastery at each level requires all senses to function adequately in order for the child to perform all life functions, see Figure 1. The levels start with all major sensory systems requiring adequate stimulation and flow to the brain. The *primary level* includes the integration of the tactile system. An infant must interpret the tactile sensations appropriately in order for him/her to form an emotional attachment to their caregiver. In this same level vestibular and proprioceptive sensations are integrated to develop the functions of eye movements, posture, balance, muscle tone, gravitational security. The *second level* is achieved when the proprioceptive, vestibular, and tactile systems are integrated. From the integration of these systems, body perception, bilateral integration, motor planning, attention span, and emotional stability are developed. Vision and auditory senses are not as significant at this level to develop the functions stated above; the visual and auditory senses enter the picture in the third level. At the *third level*, auditory and vestibular sensations combine for the child to speak and understand language. At this level visual input along with vestibular, proprioceptive, and tactile input are integrated in order to allow the
child to develop hand-eye coordination, visual perception, and perform functions that are more purpose driven such as using utensils to eat, drawing, building things and taking them apart. In the last and forth level, “everything comes together to form the functions of the whole brain” (p. 61). The fourth level contains all of the senses which are foundational for concentration, organization, self-esteem, self-control, self confidence, academic learning ability, abstract reasoning, and brain/body specialization; these are the end products of the process of the first three levels (pp. 59-61).

According to Ayres (1979) all components of each level do not need to be completed in order to move on to the next level of development and the functions do not develop at one specific age, but they are a process of sensory integration throughout childhood. The ability to interact with the environment and perform occupations increases with each level. Therefore, SI is the foundation for learning. Ayres called it the “building blocks” (p. 15) of leaning to develop more mature activities; sensory integration intervention driving occupational therapy treatment indirectly affects the child’s occupational performance.
Modulation

Hypersensitive/Hyposensitive

Modulation is the term for how the brain processes sensory information, some sensations are recognized and others are inhibited. As defined by Ayres (1979) modulation is, “The brain’s regulation of its own activity. Modulation involves facilitating some neural messages to produce more of a perception or response, and inhibiting other messages to reduce excess or extraneous activity” (p. 182). Kranowitz (1998) simply stated that, “modulation balances the flow of sensory information coming into the central nervous system” (p. 43).
If children are unable to modulate information, particularly vestibular, proprioceptive, and tactile, they may be either hypersensitive or hyposensitive to stimuli.

**Hypersensitivity** is also seen as the CNS being hyperactive, hyperresponsive, or overactive. A child can have sensory defensiveness including: tactile defensiveness, gravitational insecurity, and defensiveness to other sensory input. Hypersensitivity causes a child to overreact to sensory stimuli. These reactions demonstrate themselves in some children as inappropriate behaviors, volatile emotions, impulsive behaviors, or out of control behaviors. This child “needs guidance to engage in active, meaningful play” (Kranowitz, 1998, p. 58).

**Hyposensitivity** is also seen as the CNS being underreactive, hyporesonsive, or hyporeactive. Parham and Mailloux (2001) stated hyposensitivity is considered a problem with sensory registration. This includes registering sensory information less intensely than normal, if at all, and/or registering the information but not responding to it. According to Kranowitz (1998), a child who is hyposensitive may perceive they are not getting enough sensory information and thus seek stimulation to achieve normal alertness. They may touch everything, bump and crash into walls, or chew on various objects seeking extra stimulation. On the other hand, the author pointed out
that the child could be withdrawn into his/her own world and difficult to engage. This child tires easily and cannot seem to initiate activities. “The child needs help to find safe, appropriate activities that will encourage more organized and purposeful behavior” (Kranowitz, 1998, p. 59).

Sensory Dysfunction

Sensory integration dysfunction can occur at different levels. It can affect one or more of the senses/sensory systems. Input from the three sensory systems plus what is seen and heard is crucial to the development of mature motor planning, using both sides of the body together (bilateral integration), balance, hand-eye coordination, language, visual perception, and controlling emotions. An occupational therapist will work with the child and provide a safe environment to allow the child to explore their senses. The therapist will be looking for appropriate behavior and adaptive responses to the sensory challenges the child is faced with. Therapists look for improvement in the following areas: gross and fine motor movement, interpersonal skills, academic performance, self-esteem, and language
The therapist is not teaching these skills rather he/she is helping the child to function better physically, emotionally, and academically. The therapist wants the child to be better able to learn any motor skill, academic skill, or the good behavior they need in life (Arkwright, 1998).

Carol Kranowitz (1998), the author of *The Out-of-Sync Child,* provided a vivid description of the differences seen between a child with normal SI and a child with SI dysfunction.

**A child with normal SI**
During recess, Susan, seven plays jacks. She ignores the cold pavement because the game interests her. However, her hands are cold, too, so she doesn't play well. The first time she fails to scoop up the jacks, she’s disappointed. The second time, she’s thoroughly frustrated. She stands up and says, “I’m going to jump rope.” Jumping rope for a few minutes warms her up and calms her. After recess, Susan returns to her classroom and is attentive until lunchtime. (p. 45)

**A child with SI Dysfunction**
Beth, seven, is playing jacks. She can’t concentrate because the cold pavement distracts her. On her first two turns, she has trouble scooping up the jacks. Beth tries again, but her hands are too stiff. Suddenly, she explodes and screams, “I hate jacks!” She jumps to her feet, kicks the jacks into the grass, and leans against the building, crying uncontrollably. Unhappy for the rest of the morning, she can’t calm down to attend to the reading lesson, and she refused to eat lunch. (p.45)
THE SENSORY SYSTEMS

The three sensory systems are made up of the three near senses. These are the proprioceptive system, vestibular system, and the tactile system.

**Proprioceptive system**

The proprioceptive system gathers information from receptors in the muscles and joints. The information is sent to the cerebral cortex where it is integrated with other input; and an individual then understands where there body is in space and how the parts are moving. When the proprioceptive system is processing information appropriately, the individual’s as the ability to “develop smooth coordinated movements” (Arkwright, 1998, p. 11).

**Symptoms of dysfunction:** If the proprioceptive system is not functioning correctly children may have trouble with fine and gross motor movements. They may be unable to gage their grip strength and squeeze fruit until it smashes or break their pencils. Some children are unable to position their body correctly to start an activity, such as, kicking a ball and they may have difficulty changing position (moving right or left to catch a ball). Children with proprioceptive dysfunction may need to look to see what they are doing and are always bumping into things; they appear to be clumsy. Children who are hyporesponsive to proprioceptive input tend to seek out
proprioceptive input in order for the body to recognize the input as adequate. These children usually like to rock back and forth, bang their head against the couch or wall, squeeze between furniture, jump on beds, and lay under heavy blankets. All of these behaviors provide proprioceptive input and could even be seen as a positive way to cope with the lack of proprioceptive input as long as they do not interfere with other functions and the child is not harming themselves.

**Treatment:** To improve body awareness and postural security the child will swing while lying on stomach on specialized swings in order to experience specific movements. Specific activities to facilitate proprioception are done against resistance from physical force or gravity. The therapist uses activities such as the crab walk, the two person wheel barrow walking, pillow fights, carrying heavy items, playing tug of war, swimming, jumping on the trampoline, wrapping up in a blanket, covering the body with sand, balls, noodles, beans, or rice, and playing leapfrog (Kranowitz, 1998).
**Vestibular System**

The vestibular system tells an individual whether their body is moving or standing still, what direction it is moving in, and where it is with regard to gravity. With this information muscle tone and posture are maintained, the visual field is adjusted to compensate for movement of the head or body, and both sides of the body can work together. This is the sense of balance. The receptors for this sense are located in the inner ear. There are two structures related to the sense of balance, the vestibule responding to straight line movements (static equilibrium) and the semi-circular canals responding to spinning or diagonal movements (dynamic equilibrium). The receptors from the inner ear send information to the brain to be processed. After processing the information sent to the brain from the inner ear receptors, motor commands are sent to eyes and body for reflexive movements and information is sent to the brain to give perception of space and orientation in space (Arkwright, 1998).

**Symptoms of dysfunction:** A child who gets car sick, dislikes carnival rides, is scared to lean over backwards, roll in a barrel, or swing is showing signs of a hyperactive vestibular system or gravitational insecurity. A child who stumbles or falls a lot, has trouble performing activities requiring both sides of the body, does not try to catch himself when falling, loves fast and moving equipment, does not get
dizzy, and confuses their right and left is showing signs of a hypoactive vestibular system (Arkwright, 1998).

**Treatment:** To improve balance the child will work on sitting or lying on a large inflated therapy ball. To decrease gravitational insecurity the child can gently swing in different positions or jump on a bounce pad. Specific activities used by therapists to develop vestibular integration are spinning on a merry-go-round or sit’ n spin, sliding in different positions, jumping on a trampoline, walking on an uneven surface such as various toys covered with a blanket or mat, sitting on a T-stool, laying on the stomach with head up to complete activities, sitting on a therapy ball to complete activities, and riding on trikes, bikes, or scooters in different positions (Kranowitz, 1998).

![Activity Images]

**Tactile System**

Ayres (1979) explained that the tactile system sends information from receptors of touch, pressure, pain, texture, heat or cold, and movement of the hairs on the skin to the brain. Arkwright (1998) further explained the responses to these sensations as discriminative or protective. Discriminative tells the body where and what is being
touched. For example, feeling vibration, light touch, pressure, or identifying an object only by touch (stereognosis) triggers anticipation and identification of incoming sensory information. Protection is in the response to sensations of danger. The body identifies something is wrong from pain, temperature, or basic touch triggering strong emotions and/or a flight or fight response. These two types of touches must be balanced in order for the body to react appropriately to tactile input.

**Symptoms of dysfunction:** A child with hypersensitivity/tactile defensiveness may dislike brushing teeth; not like the feel of some clothes or tags, not like sand, finger paint, or grass, dislike crowds, avoid messy situations, and certain textures; be a picky eater, and may become aggressive when a touch is registered as a threat. On the other hand, a child with hypoactive tactile dysfunction may not react to pain and craves to be held and touched (Arkwright, 1998).

**Treatment:** To improve tactile discrimination the child will work on finding different toys hidden in a ball of therapeutic putty or in a bucket of uncooked rice. Tactile defensiveness can be reduced by having arms and legs rubbed by different textured objects. Specific activities an occupational therapist may use to develop tactile integration include, playing in a pool, finger painting or drawing, playing in the sand, exposing the child to a variety of objects of
different size and texture separately or all at once, finding objects in sand or noodles, blowing bubbles, licking suckers, chewing gum, mixing dough with hands, and back rubs providing different levels of pressure (Kranowitz, 1998).

Multiple Sensory Systems

As stated previously in this chapter the child can exhibit difficulties processing input from more than one sensory system.

- To increase the ability to use both sides of the body together a child can roll a rolling pin or bat a ball hanging on the ceiling with both hands.
- Moving through obstacle courses is used to improve motor planning.
- To build up muscles in the hand to stabilize the joints for fine motor activities magnets are manipulated and played with or the child swings from trapeze with arms extended.
- Riding on a scooter, stomach down, down the hall is used to gain an ability to pull up away from gravity.
- To improve flexion the child can cling to cylinder swing hung from the ceiling.
- Playing games with objects suspended from the ceiling such as balloons, balls, or bean bags improves ocular motor control and visual-spatial perception. (Kranowitz, 1998)
PARENT ROLE

Caring for a child with disabilities is a huge responsibility and a lot of hard work especially if the child has unpredictable behaviors that parents must deal with on a daily basis. Parents often feel alone in this battle and can become overwhelmed. Professionals working with the child can support the parent if they understand where the parent is coming from in specific situations.

The parent plays a major role in this SI intervention process. Cohn & Cermak (1998) conducted a study to look at possible measures that impact the sensory integration intervention and its relationship between child and parent. The authors found that parents gain an understanding of their children and how they function on a different level thus decreasing parental stress with SI interventions. Parents are confused, anxious, and want answers before they find that SI treatment is an option. Participants in a study by Cohn (2001) stated that they were looking for a "cure" to fix their child’s problems, but later realized it is not a cure that needs to take place but a greater understanding of their child and how they function differently from other children. Parents reported that the most significant change was when they began to view the possibility that their child "could succeed in the social world in which they live, work, and play" (p. 288).
Information seeking is seen as a positive coping strategy when dealing with a child who has a disability. Professionals were found by Pain (1999) to be the number one source for parents to gain information about their child with disabilities. Communication was the most common medium for information delivery. The author noted that information is needed on an ongoing basis in order for parents to have sufficient knowledge of their child’s disabilities and feel more in control of their family’s life. Pain stressed that all parents need to know about their child’s disability and what is recommended as best for the child and family life. “The obligation lies with health professionals to convey that information in a way the parent can understand” (p. 310). Parents play a major role; they must understand the sensory integration treatment and be willing to implement some ideas into the child’s and family’s daily routine.

**At School**

At school the primary role of the parent is communication with the school and their child’s teachers, nobody knows their child better then the parent. They must let those working with the child at school know what their child likes and dislikes and about any techniques they have found useful at home to arouse the child or settle him/her down. Some parents are reluctant to tell others
about their child’s problems for fear the child might be seen as different or stigmatized. In order for the child to get the most out of his/her education, the teacher must know how to approach the child in a way to best meet his/her needs. Any professional who works directly with the child should be kept informed. The information shared should be specific examples of what the child tolerates and doesn’t tolerate. Avoid using terms like hyporesponsive to vestibular sensations. This may confuse those working with the child; giving them examples works better. Make sure whatever information is shared is positive and stress the child’s abilities, for example, “she attends wonderfully when...”, or “he has a great imagination and loves to make...”. It is best if the teacher is contacted and given the information before the school year starts. The parent should arrange a meeting time, and if there are any modifications to be made the teacher(s) will have time to make accommodations for the child. If for some reason the teacher, principle, or school is unable to make reasonable accommodations the parent may want to explore other options: another teacher, a special education program, another public school, or a private school (Kranowitz, 1998).

It is also very useful for the parent and teacher if a communication book is used between home and school. Teachers
and parents can report how their morning, day, or evening went. If the morning routine at home was stressful, the child threw a fit because he refused to brush his teeth and eat oatmeal, this will carry over to school and it is helpful to the teachers to know what happened prior to him stepping off the bus. The teachers can use this book in the same way. If the child had an off day and was unable to attend to classroom activities or participate overall, the teacher can inform the parent so they will be ready to deal with the child’s behavior when he returns home. This communication book can be a notebook, folder, or binder.

**Home**

In her book Kranowitz (1998) suggested that a balanced “Sensory Diet” can make life at home run more smoothly for both child and parent. A balanced sensory diet is a planned and scheduled activity program developed specifically for the child by an occupational therapist. This diet focuses on what specifically that child’s nervous system needs physically and emotionally. The diet will be individualized as to how much tactile, vestibular, and proprioceptive nourishment is provided. A child with sensory processing difficulties needs more of this nourishment but doesn’t know how to get it. The goal is to help the child attend to
tasks, adapt to change, and increase skills. Activities to be used at home include those to alert, organize, and calm the child’s senses. Most are easily incorporated into the daily routine.

- Alerting activities to effectively arouse the child and sustain their attention include: eating crunchy foods (popcorn, cereal, pretzels, carrots, apples, or ice cubes), taking a shower, bouncing on a big ball, and jumping on a mattress.

- Organizing activities to control the child’s responses include: eating something chewy (licorice, gum, cheese, dried fruit, bagels, or jerky), hanging by hands from a monkey bar, pushing or pulling heavy loads, and being upside down.

- Calming activities to decrease excess sensory input for the hyperresponsive child include: cuddling, being wrapped up in a blanket, pushing against walls, sucking on hard candy, popsicle, or peanut butter, rocking, and taking a bath. (Kranowitz, 1998).

The overall goal of sensory integration treatment is to improve the child’s ability to function in their environment. Most children’s environments are structured by caregivers or adults; thus education for parents must be provided in order to help them maintain a healthy environment for their child. It is assumed that providing direct treatment to the child and education to the caregiver will result in an overall positive effect on the entire family system. A child will be
better able to perform roles assigned to him/her with improved organizational behavior responses.

**In Therapy**

Before the initial visit to the occupational therapist, a parent must speak positively about therapy; the child should be excited to come and not scared in anyway. The parent can explain how the therapist will have lots of fun toys to play with and that the therapist can help them get stronger and feel better.

A child does better if the parents supports therapy fully, which can be done in the following ways. The parent can expect to collaborate with the therapist in writing goals for the treatment plan. The therapist needs to help the parents to incorporate any therapy they see in sessions into their daily routine; this may include making a home program provided by the therapist a family value everyone supports. The therapist can better treat the child if the parent provides information about observed progress or regression seen outside of therapy, and by simply communicating regularly (Arkwright, 1998).

Cohn (2001) conducted a study with parent interviews based on their view of the child’s participation in SI treatment in occupational therapy. The researcher found that participants who started therapy
with a positive outlook on occupational therapy saw positive changes in their child’s functioning in the areas of abilities, activities, and sense of self worth. The parents who questioned the benefits of occupational therapy did not notice changes in their child related to a broader social world. Overall a parent’s participation in the treatment process is crucial for the advancement of their child. The involvement fosters positive parent-child interaction, and an understanding of the child and their disability.
THE CHILD’S EMOTIONS

It is possible for a parent to cope with the child and their emotions if the parent understands their child, has support and understanding, and educates themselves. Kranowitz (1998) offered some coping techniques. First pay attention the child, remember that their disability is not a physical one, find the best way to communicate with the child, and know the child’s strengths and weaknesses. Secondly anticipate responses, realize when certain levels of stimulation are too much, and develop positive ways to deal with the child’s negative emotions. Next emphasize from the child’s point of view, give them words to explain how they are feeling, share similar emotions, build on the child’s strengths, and give them positive feedback and encouragement. Also provide structure and discipline for the child, establish routines and schedules, avoid punishment for negative behaviors instead provide a quite environment away from increased stimulation, set limits, and be firm.
PARENT RESOURCES

There are many good resources on SI treatment and SI dysfunction. Many of the resources are difficult to grasp because they are written using physician or therapist terminology. The greatest resource to parents can be the therapist who is working with the child. He/she can answer specific questions a parent may have and provide activities that he/she and the parents feel will be compatible with the routine in the home environment.

There are extensive lists of activities in the following books that can be incorporated at home. The activities are further broken down into developing specific skills and sensory systems. Parents may also find a more complete list of materials for additional activities and information in the following.

Resource List


**Websites:**

http://www.alertprogram.com/
- This website is useful as it describes an approach that facilitates children, teachers, parents, and therapists to follow the same strategies used to change or maintain states of alertness.

http://www.sensorysmarts.com/
- This website is was prepared by Lindsey Biel, OTR/L, a pediatric occupational therapist and Nancy Peske, the parent of a child with sensory integration dysfunction. Together they have written the book: *Raising a Sensory Smart Child*. The book addresses the kinds of questions parents need answered and hands-on activities for parents of children with sensory problems and SI dysfunction.

http://www.sinetwork.org/
- The Sensory Processing Disorder Community Network developed this website to help parents and the family to learn more about SI dysfunction and find effective treatment.
REFERENCE LIST


CHAPTER V

There were implications found by the author for use of the parent education manual. Based on the literature, a parent’s participation in the treatment process is crucial for the advancement of the child. The involvement fosters positive parent-child interaction, and an understanding of the child and their disability (Tetreaut, Parrot, & Trahan, 2003, Hinojosa & Anderson, 1991, and Kirk, 2001). It is recommended that therapists use this manual as a supplemental guide to treatment for parents. Therapists can give this manual to parents struggling to understand their child with sensory dysfunction. The manual is intended to be used at home under the direction of an occupational therapist to provide the parent with valuable information. There are numerous studies on the effectiveness of SI techniques and their global use for different diagnosis, however, most of these studies lack rigor and do not produce specific enough results to base treatment on.

Based on the literature reviewed, it is recommended that future development and research be done in the area of sensory integration to support evidenced based practice. Therapists who use this product as part of the treatment process should document the effectiveness of having a manual for additional parent education. More research is needed to determine if a child's outcomes improve when there is parental involvement in SI treatment. Because changes are constantly taking place, it is important to implement evidenced based practice in order stay current in clinical practice and support professional competency.
REFERENCES


