

Best Practice in the Use of Sensory Integration in School-Based Occupational Therapy:

Combining Research and Practical Strategies

By Dana M. Berthiaume, EdD, MSA, OTR/L
berth1dm@hotmail.com

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Course Description

- ▶ **Course Description:** The purpose of this webinar is to provide evidenced-based research to guide occupational therapists within the school setting when providing sensory integration treatment to students. This course aims to link research to practice to assist therapists in picking out therapeutic strategies and activities.
- ▶ **Instructional Level:** Basic to Advanced- This course assumes that the learner has little to basic knowledge of the subject. The learner seeks to familiarize self with terms and current research and best practice. The learner seeks to learn advanced knowledge about the topic.

Course Description

- ▶ **Relevance of Course to Profession:** This course addresses the issues of best practices in the school setting in the area of sensory integration.
- ▶ This course links current research to areas of sensory integration, citing recent studies.
- ▶ This course attempts to improve the practices of therapists in the area of sensory integration, as well as increase therapist knowledge in the areas of research based best practice sensory integration strategies, linking research to practical application.

Course Objectives

- ▶ Discuss a brief history of sensory integration.
- ▶ Discuss the various definitions of sensory integration.
- ▶ Discuss neurological basis for providing sensory integration treatment.
- ▶ Current views surrounding sensory integration treatment.
- ▶ Discuss theoretical framework for providing sensory integration treatment.
- ▶ Review studies based on current research in the areas of sensory integration treatments.

Course Objectives

- ▶ Provide assistance to occupational therapists in choosing therapeutic activities and strategies that is based on best practice literature.
- ▶ Link sensory integration to the concept of self-regulation and review different strategies addressing self-regulation.
- ▶ Assist occupational therapists in articulating "why they do what they do" with children to teachers, administrators, parents and caregivers.
- ▶ Link theory and research to help the occupational therapists choose the best treatment activities and provide the evidenced-based therapy best therapy possible.

Course Objectives

- ▶ Link theory and research to help the occupational therapists choose the best treatment activities and provide the evidenced-based therapy best therapy possible.
- ▶ Provide examples of activities based on evidenced based research.
- ▶ Discuss goal writing as related to sensory integration and self-regulation.
- ▶ Therapy recommendations and service delivery models.

Brief History of Sensory Integration

- ▶ Jean Ayres proposed the concept of Sensory Integration, as one of the first theories in the field of occupational therapy (Roley, Mailloux, Miller-Kuhaneck, Glennon, 2007).
- ▶ Motor Control Theories provided the basis for Ayres development of Sensory Integration Theory.
- ▶ In 1960, Ayres proposed that:
 - ▶ 1. Learning takes place as a function of reward or reinforcement.
 - ▶ 2. One learns what he/she does.
 - ▶ 3. Learning takes place because there is a purpose for it for taking place.
- ▶ Ayers believed that a person must perceive the goal and the process of the intervention in order to benefit from it. Ayers focused on the perceptual awareness of occupational engagement.

Brief History of Sensory Integration

- ▶ Ayres proposed that motor learning follows maturational sequences and is influenced by, if not dependent on, incoming sensory input (Roley, Mailloux, Miller-Kuhaneck, Glennon, (2007).
- ▶ Ayres proposed:
 - ▶ The development of the body scheme in children created a postural model to understand visual-motor development
 - ▶ The ability to sit up and sit still required perceptual support from the vestibular and proprioceptive systems in addition to the neuromotor systems.
 - ▶ The tactile, vestibular, proprioceptive, and visual systems provided key data in the development of reading and writing and may be impaired in children with learning disabilities.
 - ▶ The ability to focus and maintain attention and to keep a steady level of activity were related to the way in which the nervous system responds to tactile and other sensations.

Brief History of Sensory Integration

- ▶ Ayres proposed that sensory systems do not develop independently of each.
- ▶ Visual and auditory processing depends on the foundational body-centered senses.
- ▶ Sensory information is not processed in isolation (Roley, Mailloux, Miller-Kuhaneck, Glennon, (2007).
- ▶ Learning is dependent on one's ability to take and process sensations from movement and the surrounding environment and use that information to plan and organize behavior" (Bundy, A. C., Lane, S., & Murray, E. A., 2002)

Sensory Terminology

- ▶ **Sensory Integration:** A theory and a frame of reference (Roley, Mailloux, Miller-Kuhaneck, Glennon, (2007).
- ▶ **Sensory Integration:** A process in which multimodal sensory information is formed and multisensory information is retrieved from the central nervous system.
- ▶ **Sensory Registration:** A process referring to the brain's ability to receive input and select that input which will receive attention and which will be inhibited from consciousness ([http://medical-dictionary.thefreedictionary.com/sensory+registration.](http://medical-dictionary.thefreedictionary.com/sensory+registration))
- ▶ **Sensory Processing:** Is a term to describe by which sensory information is detected, converted into a message/response and transmitted throughout the nervous system.

Sensory Terminology Continued

- ▶ **Sensory Modulation:** Modulation is the process of increasing or decreasing neural activity in response to sensory stimuli to formulate an appropriate response to the environment (Wilbarger, J. & Murnan-Stackhouse, T., 1998).
- ▶ **Sensory Processing Deficits:** Describes when the processing of sensory information is flawed.
- ▶ **Sensory Integrative Deficits:** Are determined by occupational therapists by using standardized assessments, skilled observations, and parent and teacher report.
- ▶ **Sensory Processing Disorder:** Is a condition in which the brain has deficits in receiving and responding to information that comes in through the senses. It can effect one, several or all senses and vary in degrees of severity (www.webmd.com/children/sensory-processing-disorder).
- ▶ **Sensory Based Strategies:** Strategies that are implemented by occupational therapists to either treat, remediate or accommodate sensory integration deficits (Roley, Mailloux, Miller-Kuhaneck, Glennon, (2007).
- ▶ **Self-Regulation:** Self-regulation is the ability to manage emotions and behavior in according to the demands of the situation (<https://childmind.org/article/can-help-kids-self-regulation/>)

Neurological Basis for Providing Treatment Deficits in Sensory Integration

- ▶ Sensory processing disorders (SPD) are more prevalent in children than autism and as common as attention deficit hyperactivity disorder, as the symptoms of sensory processing deficits are present in these diagnoses.
- ▶ However, SPD has received less attention partly because it's never been recognized as a distinct disease (Bunim, 2013).
- ▶ SPD itself is not listed in the DSM-5 and sensory integration deficits are often seen as a part of other diagnoses.
- ▶ SPD alone, affects, 5-16% of school-aged children and can cause long-term deficits in intellectual and social development (Owen, J.P., Marco, E.J., Desai, S., Fourie, E., Harris, J., Hill, S.S., Arnett, A.B., & Mukherjee, P., 2013).

Neurological Basis for Providing Treatment Deficits in Sensory Integration

- ▶ A recent study showed that white matter differences boys diagnosed with sensory processing disorder (Owen, J.P., Marco, E.J., Desai, S., Fourie, E., Harris, J., Hill, S.S., Arnett, A.B., & Mukherjee, P., 2013).
- ▶ Sixteen boys, 8-11 years old, diagnosed with SPD were matched with 24 boys, same age, gender, handedness and IQ to partake in the study.
- ▶ Results showed significant decreases in fractional anisotropy and increases in mean diffusivity and radial diffusivity were found in the SPD group compared to control group.
- ▶ Areas involved included posterior white matter including the posterior corpus callosum, posterior corona radiata and posterior thalamic radiations.
- ▶ Strong positive correlations were observed between FA of these posterior tracts and auditory, multisensory, and inattention scores ($r = 0.51-0.78$; $p < 0.001$) with strong negative correlations between RD and multisensory and inattention scores ($r = -0.61-0.71$; $p < 0.001$).

Neurological Basis for Providing Treatment Deficits in Sensory Integration

- ▶ This is the first study to demonstrate reduced white matter microstructural integrity in children with SPD.
- ▶ This demonstrated that that the disrupted white matter microstructure predominantly involves posterior cerebral tracts and correlates strongly with atypical unimodal and multisensory integration behavior.
- ▶ These findings suggest abnormal white matter as a biological basis for SPD and may distinguish SPD from overlapping clinical conditions such as autism and attention deficit hyperactivity disorder, as it's own separate condition.
- ▶ (Owen, J.P., Marco, E.J., Desai, S., Fourie, E., Harris, J., Hill, S.S., Arnett, A.B., & Mukherjee, P., 2013).

Neurological Basis for Providing Treatment Deficits in Sensory Integration

- ▶ These findings correlate with Ayres hypotheses from decades ago, that disruption occurs in the brain processing of sensory input and the central nervous system can alter the incoming sensations and thus cause sensory processing deficits.
- ▶ Ayres also surmised that since incoming sensation is the building block for motor development and learning, that motor control and learning can be altered based on deficits in this sensory process.
- ▶ Ayers proposed that motor learning follows maturational sequences and is influenced by incoming sensation.
- ▶ (Roley, Mailloux, Miller-Kuhaneck, Glennon, (2007).

Neurological Basis for Providing Treatment Deficits in Sensory Integration

- ▶ Ayres proposed that:
 - ▶ The ability to sit up and sit still requires perceptual support from vestibular and proprioceptive systems in addition to neuromotor systems, thus making postural control an essential foundation for academic and motor performance.
 - ▶ Tactile, vestibular, proprioceptive and visual systems provide eye data in the development of reading and writing and may be impaired in children with learning disabilities.
 - ▶ The ability to focus and maintain attention and keep a steady level of activity were related to which the nervous system responds to tactile and other sensations.
- ▶ (Roley, Mailloux, Miller-Kuhaneck, Glennon, (2007).

Current Views Surrounding Sensory Integration Treatment/Controversies

- ▶ Sensory integration treatment is met with mixed views as to the effectiveness of it treatment approach children with autism, ADHD, and sensory processing disorders within both the school and the clinical setting.
- ▶ These mixed views on the effectiveness of treatment are within the occupational therapy profession itself and other professions.
- ▶ A review of 25 research studies by Lang, et al, in 2012, reported a lack of scientific evidence to support the effectiveness of sensory integration treatment.
- ▶ The Individuals with Disabilities Education Improvement Act and No Child Left Behind Act require that schools implement evidenced-based interventions (Lang, et al, 2012).
- ▶ Research suggests that outside of the research context with approvals from ethics committees and informed consent, that sensory integration treatment should not be performed in the schools.

Current Views Surrounding Sensory Integration Treatment/Controversies

- ▶ A review of 27 research studies by May-Benson and Koomar (2010), demonstrated that sensory integration treatment may result in positive outcomes in sensorimotor skills and motor planning.
- ▶ Positive results may also result in socialization, attention, behavior regulation, academics and participation.
- ▶ Gains were also noted in active play, gross motor skills, reading and achievement of individual goals.
- ▶ Gains were sustained from 3 months to 3 years.
- ▶ Current research provides mixed views on sensory integration treatments.
- ▶ A therapist must use sensory integration treatments with caution, finding out what the school policy is and remembering sensory integration treatment involves active engagement in a therapeutic setting.
- ▶ It is important that any type of sensory integration treatment implemented must be to support the child toward making progress towards the IEP goals in the least restrictive environment.

Theoretical Framework for Providing Sensory Integration in the Schools

- ▶ The American Occupational Therapy Association (AOTA) recognizes sensory integration (SI) as one of many theories and methods used by occupational therapy professionals working with children in public/private schools (AOTA, 2009).
- ▶ The focus of these methods are to improve a child's ability to access the general education curriculum, to participate in school-related activities, improve the child's health and increase participation in everyday occupation.
- ▶ SI methods are used within occupational therapy when sensory-related issues affect a child's ability to access the general/special education curriculum, behave adaptively, and participate in activities at school.

Theoretical Framework for Providing Sensory Integration in the Schools

- ▶ Occupational therapist's should consider existing academic and nonacademic expectations within the school when determining the child's academic, adaptive, and functional needs (AOTA, 2009).
- ▶ **Conducting Evaluations:**
- ▶ Evaluations in the educational setting must include a review of educational information including:
 - ▶ Information and evaluation results provided by the parents.
 - ▶ Assessment or observation results related to performance in the current classroom or on local or state assessments.
 - ▶ Teacher and other service provider observations.
- ▶ **Other considerations include:** pertinent medical information, parent and teacher interviews, student observations and various assessments- including standardized tests.

Theoretical Framework for Providing Sensory Integration in the Schools

▶ Conducting Evaluations:

- ▶ Multiple sources of information should be used when determining educational disabilities and if a child should receive occupational therapy services (AOTA, 2009).
- ▶ The occupational therapist selects a variety of measures that include developmental, skill-based observations in addition to those that identify occupational, functional and sensory strengths and weaknesses.
- ▶ The occupational therapist interprets the test findings relative to the child's performance skills, patterns of engagement, and ability to participate in the general education, special education and non-educational settings, such as recess, walking in the hall, library time and lunch.

Theoretical Framework for Providing Sensory Integration in the Schools

▶ Conducting Evaluations:

- ▶ Sensory Integration Evaluations should include performance measures of the child's ability to adapt, organize, and integrate sensory information in the environment that affects participation in academic/nonacademic settings (AOTA, 2009).
- ▶ Sensory deficits are complex and include various patterns of perceptual, motor, and praxis difficulties affecting the speed and accuracy of learning as well as variations in sensory responsiveness affecting emotional well-being and social competencies, including play and learning.
- ▶ Structured and unstructured assessments of sensory responsiveness, sensory perception, motor skills, and praxis are essential features of the evaluation.
- ▶ Multiple data sources should be used when evaluating skills and performance in sensory integration.

Theoretical Framework for Providing Sensory Integration in the Schools

▶ Conducting Evaluations:

▶ There are Several Tools for Conducting Evaluations-

- ▶ DeGangi Berk Test of Sensory Integration: is a preschool screening focused on sensory-based postural and motor functions.
- ▶ Sensory Integration and Praxis Tests (SIPT): is a standardized performance measure used to diagnose sensory integrative dysfunction related to learning and behavior. Certification is required to administer this test.
- ▶ Sensory Processing Measure (SPM): is for home and school. It is an integrated system of rating scales that enables assessment based on parent and educational staff report of sensory processing issues, planning and ideas, and social participation in elementary school-age children.
- ▶ Sensory Profile: (Infant/Toddler Sensory Profile/Sensory Profile School Companion): are standardized questionnaires that focus on the student's sensory processing performance patterns within the natural context (AOTA, 2009).

Theoretical Framework for Providing Sensory Integration in the Schools

▶ Evaluations Continued:

- ▶ Unstructured assessments may include direct observation of the child's performance in a variety of tasks to analyze the sensory-motor and cognitive demands of the activities.
- ▶ Observations of the social and physical characteristics of the environment(s).
- ▶ Observations of the effectiveness of the student's performance skills and patterns in those activities and environments.
- ▶ Observations and assessments of neuromotor functions via clinical observations of learning, play and performance (AOTA, 2009).
- ▶ Observations of sensory integration may take place in all educational environments, including settings which may be most problematic such as the playground, lunch room, library, gym, art room, etc.

Theoretical Framework for Providing Sensory Integration in the Schools

▶ Sensory Integration Treatment/Goal writing:

- ▶ The IEP team determines if occupational therapy services are needed based on recommendations from the occupational therapist.
- ▶ The occupational therapist recommends goals for the child based on the evaluative findings, skills deficits and functional deficits.
- ▶ Sensory deficits and sensory issues should be addressed through goals that are related to the child's education and are functional.
- ▶ Treatment sessions should occur in the least restrictive environment. Removal from the general education setting should only occur when the child's nature or severity of the disability is such that the goals cannot be addressed in the regular education setting (AOTA, 2009).

Theoretical Framework for Providing Sensory Integration in the Schools

▶ Treatment Environment:

- ▶ Occupational therapy interventions can occur many different kinds of settings to support the child's success within the least restrictive environment (LRE).
- ▶ Service delivery can include locations at the school such as the classroom, playground, lunchroom, bathroom, gym, or therapy room and off-site locations within the community.
- ▶ Interventions may include occupational therapy interventions such as, preparatory methods, purposeful activities, and occupation-based interventions, depending on the needs of the child and identified outcomes (AOTA, 2009).

Theoretical Framework for Providing Sensory Integration in the Schools

- ▶ Sensory Integration Treatment in the Schools:
- ▶ Occupational therapy services in schools include the application of specialized knowledge and skills to facilitate adaptive responses the children need to support their learning and behavior (AOTA, 2009).
- ▶ Consultation and direct intervention are both aspects of the service.
- ▶ SI Interventions may include:
 - ▶ Education that reframes the understanding of the sensory-related concerns.
 - ▶ Recommendations that incorporate sensory-motor activities throughout the day such as before, during, and after school.
 - ▶ Environmental modifications that assist the student's school-related performance.
 - ▶ Sensory activities directed by the occupational therapist can be embedded into the classroom routine that can be carried out by the teacher, instructional aides, or parent volunteers.
 - ▶ Treatment may also include: direct intervention that address the underlying sensory, motor, and praxis concerns through therapeutic use of environment such as mats and swings to provide opportunities to move through space; climbing in, over, and under large equipment; falling safely onto matted areas; and rearranging the equipment.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A Study Regarding Sensory Processing Disorder:
- ▶ A study by Owen, et al., (2013) demonstrated that children with isolated sensory processing disorders have quantifiable differences in brain structures.
- ▶ Children diagnosed with SPD had decreased white matter microstructures affecting posterior cerebral tracts.
- ▶ The reduced integrity of the white matter microstructures in children with SPD directly correlate with atypical sensory behaviors.
- ▶ Children diagnosed with SPD have specific biomarkers for this disorder and SPD is a stand alone disorder, distinct from overlapping disorders such as ADHD and autism, although it is not a diagnosis that is found in the DSM-IV.
- ▶ SPD characteristics are found in children with ADHD and autism.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A study by Parham et al (2011) discovered more than 70 articles have been published on sensory integration, but fidelity in intervention is a major concern in the research studies.
- ▶ Researchers conducting these studies do not report whether designed sensory intervention whether they monitored intervention delivery during the study to ensure that it maintained a high degree of fidelity.
- ▶ Other difficulties in research include the differences in SIT procedures across studies and the lack of a treatment fidelity measure in the majority of studies that prevent direct comparison of the studies with positive and negative findings (Lang et al, (2012).
- ▶ Research on sensory integration intervention has historically been flawed and should be interpreted with caution.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A study by Lang, et al, (2012) reviewed 25 sensory integration research studies.
- ▶ This study found that out of the 25 studies, 3 studies showed sensory integration treatment was effective, 14 studies reported no benefits from SIT and 8 studies found mixed results.
 - ▶ Highlights of this Research Study:
 - ▶ This study by Bagatell (2010) found mixed results for participants increasing attention span while sitting on theraballs in class.
 - ▶ A study cited a study conducted by Carter (2005) was reviewed. This demonstrated no effect on 1 subject who wore a weighted vest to reduce self injuries behaviors.
 - ▶ A study conducted by Bonggat and Hall (2010) demonstrated no effect on subjects who were given a "sensory diet" of brushing joint compression, stretching, hammock activities and theraball activities to increase attention and decrease disruptive behaviors.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ Highlights of the Lang et al (2012) Research Study:
 - ▶ A study conducted by Devlin (2011) demonstrated no decrease in challenging and self injuries behavior of children on a sensory diet including the provision of: swinging, rocking, squeezing with bean bags, rocking on a theraball, brushing and joint compression, crawling and wrapping in a blanket. This study demonstrated a no affect on the children in this study and an increase in challenging behavior for one participant. This study also showed decreased challenging behavior with behavioral interventions.
 - ▶ In conclusion, the review by Lang et al (2012) demonstrates that sensory integration treatment should be used with caution and should not be considered to be evidenced based.
 - ▶ Lang et al (2012) also warns that sensory integration treatment has the potential to increase problem behavior as SIT provides access to enjoyable activities, attention from therapists and breaks from work.
 - ▶ This study also warns that SIT may reinforce abnormal behaviors and satiate potential behavioral reinforcers by providing them frequently throughout the day.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A study by May-Benson and Koomar (2010) reviewed 27 studies on sensory integration. The purpose of this study was to review and evaluate the literature in regards to sensory integration.
 - ▶ Highlights of this study demonstrated:
 - ▶ Humpries et al (1990), (1992), and (1993) found that SI and perceptual motor approaches to therapy demonstrated improvement in children with learning disorders over no therapy at all.
 - ▶ These studies found that the SI approach found greater gains than both the perceptual motor approach and no therapy at all in motor planning, bilateral coordination, strength and motor accuracy.
 - ▶ Miller, Schoen, et al (2007) found significant gains per parent report in sensory processing skills by children treated with occupational therapy SIT.
 - ▶ Palatajko (1991) found significant gains in self esteem after six months of therapy. However these gains were not greater than those demonstrated by the perceptual-motor group.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ Highlights of the May-Benson and Koomar Study (2010):
 - ▶ Miller and Schoen, et al. (2007) found significant gains in socialization, and a decrease in internalizing/externalizing behaviors, after occupational therapy SI approach with children with problem in sensory processing.
 - ▶ Miller and Coll, et al. (2007) reported that occupational therapy using the SI approach resulted in significantly greater gains in individual functional goals than no treatment or an alternative activity based intervention in children with sensory processing problems.
- ▶ This the May-Benson and Koomar Review found: the SI approach to treatment may result in positive outcomes in sensorimotor skills and motor planning. Improvements in socialization, attention, and behavioral regulation were found. Improvements in reading-related skills, participation in active play, and achievement of individualized goals.
- ▶ Gross motor skills, self-esteem, and reading gains were sustained from 3 months to 2 years.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A study by Pfeiffer and Koenig, et al. (2011) studied the effectiveness of sensory integration treatment interventions in children aged six to twelve who were diagnosed with autism spectrum disorder.
- ▶ Children were randomly assigned to treatment groups receiving sensory integration intervention or fine motor interventions.
- ▶ This study demonstrated significant positive changes in Goal Attainment Scaling scores for both groups.
- ▶ More significant changes occurred in the SI group, and a significant decrease in autistic mannerisms occurred in the SI group.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A study conducted by Schaaf et al (2012), researched the acceptability of using a manualized protocol for SI treatment in terms of feasibility, safety and acceptability for children diagnosed with autism.
- ▶ This study demonstrated that the therapists felt the treatment was feasible and SI manualized protocol was adequate for meeting the child's goals.
- ▶ This study demonstrated that the SI treatment was safe and there were no reports of injuries amongst child or therapist.
- ▶ This study demonstrated that parents very "very satisfied" with the SI treatment, describing it at either "good" or "effective" for meeting the child's goals and daily functional skills.
- ▶ This study demonstrated that goal attainment scaling, a standardized method of documenting progress toward individual goals, was useful for capturing the changes in function/participation, which may be linked to changes in sensory processing as the result of sensory processing treatment.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ A study conducted by Weeks, Boshoff & Stewart (2012), researched the Wilbarger Brushing Protocol:
 - ▶ The Wilbarger protocol is providing by trained therapists, who train parents how to perform the technique.
 - ▶ The Wilbarger brushing protocol was the most prescriptive program used to treat sensory overresponsivity to sensory information, in children aged 2-12 years.
 - ▶ Therapists use the protocol based on strong anecdotal evidence that suggests that the Wilbarger protocol successfully reduces challenging behavior in children with sensory overresponsivity.
 - ▶ The study found a lack of high quality evidence currently exists to support or refute the use of the Wilbarger protocol with children.
 - ▶ The Wilbarger protocol should be applied with caution and further research is needed on the subject.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ Young and Furgal (2016) reviewed studies on the effectiveness of SI treatment and children with learning disabilities.
- ▶ They found research results are varied due in part to methodological limitations, however physical and occupational therapists and school professionals continue to utilize and see results in the classroom from selected SI theory-based treatment techniques.
- ▶ Demonstrating the level of effectiveness of SI treatment in isolation is a challenge because children with sensory processing issues often have multiple physical, behavioral and learning disabilities that require a number of individualized interventions that are applied simultaneously.
- ▶ SI treatment techniques can be applied in the classroom or school to improve sensory processing and integration for children with learning disabilities.
- ▶ Other strategies, such as behavioral interventions can be used in conjunction with SI treatments to manage behaviors.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

- ▶ Zimmer and Desch (2012), released a policy statement from the American Academy of Pediatrics stating that:
 - ▶ Pediatricians should recognize and communicate with families regarding the limited research on the use of sensory integration as a treatment for childhood development and behavioral problems.
 - ▶ Therapist and pediatricians should by helping families monitor the effects of treatment. This can be done by keeping diaries, conducting pre- and post- behavior rating scales and setting goals based on improving engagement and participation in everyday activities.
 - ▶ Behavior interventions are evidenced based and effective at reducing challenging and self injuries behaviors. These interventions can be paired with sensory intervention to treat the child.

Review of Current Research on the Use of Sensory Integration Treatment Strategies

► Conclusion to Literature Review:

- There are individual studies, of small sample sizes, to support the effectiveness of specific sensory integration interventions for children diagnosed with sensory processing disorders and related diagnoses such as autism and ADHD.
- There is a lack of literature consisting of large sample sizes, following populations over time.
- There is a lack of fidelity in the research conducted among researchers and therapists, making research studies difficult to compare.
- SI Treatments should be used with caution for effectiveness, under the guidance of a skilled therapist.
- SI Treatments should address goals that focus on functional outcomes in daily life.
- Behavior interventions are an effective way to complement therapy to address behaviors.

Guidelines for Providing Sensory Integration Treatment in the Schools

► Guidelines for Applying Specific Sensory Treatments:

- Therapist performs appropriate sensory evaluations as warranted by diagnoses, problems and functional deficits in the classroom (AOTA, 2009).
- Therapist chooses evaluations based on age, deficit areas, need, environments and function.
- Therapist gathers input from parents, staff, teachers and compiles relative data to form report.
- Therapist reports back to IEP on child and develops goals based on functional deficits within the school environment.
- Therapist provides treatment to target functional deficits within the school setting.
- Therapist utilizes self regulation strategies in conjunction with sensory strategies to teach appropriate school behaviors and increase functional abilities in the school environment.

Guidelines for Providing Sensory Integration Treatment in the Schools

► Guidelines for Applying Specific Sensory Treatments:

- Create opportunities for the child to get needed sensory input throughout the day. Do this by placing sensory breaks on the child's schedule.
- Use visuals and timers to demonstrate to the child when a sensory break begins and when it ends.
- Create opportunities for the child work for sensory breaks, after performing academic tasks, using pictures of rewards and working for strips.
- Create opportunities to chose sensory breaks using visuals. Give the student a choice.
- Incorporate behavior interventions/self regulation tools into SI treatment.
- Incorporate self-regulation tools to teach self regulation strategies to help children manage their behaviors (<http://autismpdc.fpg.unc.edu/evidence-based-practices>).

Guidelines for Providing Sensory Integration Treatment in the Schools

- ▶ Guidelines for Applying Specific Sensory Treatments:
- ▶ Team with teachers, other professionals and parents to incorporate sensory strategies into the child's day (AOTA, 2009).
- ▶ Provide accommodations/modifications to ease sensory distractions and distresses throughout the child's day.
- ▶ Teach both sensory strategies and self regulation strategies to the staff to address sensory deficits and subsequent behavior concerns.
- ▶ Teach self regulation strategies to the child using self regulation curriculums.

Linking Sensory Integration Treatment to Practical Application and Selection of Treatment Activities

- ▶ Establish/Restore Performance Skills and Performance Patterns (AOTA, 2009):
 - ▶ Design activities that are rich in tactile, vestibular, and proprioceptive input that increase body awareness needed during activities of daily living.
 - ▶ Facilitate the development of appropriate SI and motor-planning skills needed for organizing materials and completing tasks within an appropriate time frame and adapting to transitions.
 - ▶ Establish and restore mobility needed for social and object play.
 - ▶ Provide controlled sensory input through activities that require increasingly more complex adaptive responses to new activities to support ability to engage in group activities with peers.

Linking Sensory Integration Treatment to Practical Application and Selection of Treatment Activities

- ▶ Maintain Student Ability to Engage in and Cope With School-Related Activities (AOTA, 2009):
- ▶ Structure the sensory environment to students needs such as reducing distractions and improving attention to auditory and visual information.
- ▶ Teach sensory strategies for emotional, physiological, behavioral, motor, and social self-regulation, utilizing self regulation curriculums as appropriate.
- ▶ Maintain ability to organize behavior by providing scheduled sensory breaks and visual schedules.
- ▶ Provide sensory accommodations such as changing the lighting, noise level, and location of the desk.
- ▶ Maintain peer relationships by supporting and compensating for deficits in age appropriate games.
- ▶ Maintain student productivity by providing compensation techniques for sensory and motor-planning deficits using various equipment such as: study carrels, visual timers, weighted vests, alternate seating arrangements, modified writing tools, paper, and other assistive technology.

Linking Sensory Integration Treatment to Practical Application and Selection of Treatment Activities

- ▶ **Modify Activity to Help Student Compensate for Sensory, Motor, and Praxis Deficits (AOTA, 2009):**
 - ▶ Through collaboration with education staff, develop strategies for modifying the sensory, motor, or praxis demands of assignments to increase student productivity
 - ▶ Support student participation in general curriculum, general education environment, special education environment, by modifying sensory and motorplanning (praxis) demands of activity.
- ▶ Structure or modify the environment to support the student's sensory, motor, motorplanning, and self-regulatory capacities and needs, using equipment and visuals as needed.

Linking Sensory Integration Treatment to Practical Application and Selection of Treatment Activities

- ▶ **Prevent Barriers to Participation and Improve Safety (AOTA, 2009):**
 - ▶ Prevent inattention, poor posture, and restlessness when sitting for by modifying seating options, allowing sensory breaks, and allowing student to work in various positions.
 - ▶ Prevent social isolation by providing motor-planning and social strategies to participate with peers, may be specifically taught through curriculums.
 - ▶ Prevent socially inappropriate behaviors and behavioral distress or disruption by detecting and meeting sensory and self-regulatory needs and using visuals, sensory tools and evidenced based practices.
 - ▶ Prevent injury by providing ergonomic seating and safety sensory strategies for students whose nervous systems fail to register sensory information.
 - ▶ Prevent barriers to child participation by increasing the understanding of the school district staff regarding of the role sensory integration and best practice strategies.

Linking Sensory Integration Treatment to Practical Application and Selection of Treatment Activities

- ▶ **Create, Promote Health and Participation (AOTA, 2009):**
 - ▶ Create a class for parents/staff to teach the relationships among sensory processing, learning, and behavior.
 - ▶ Promote increased physical activity for students to improve physical, mental health, cognitive, and social performance.
 - ▶ Support installment of a variety of equipment available at schools and/or public playgrounds to promote a diversity of sensory play experiences.
 - ▶ Design sensory-enriched classrooms, offer a variety of seating options and opportunities for tactile, movement, and proprioceptive experiences throughout the day.
 - ▶ Adopt a self regulation curriculum and use it throughout the school, incorporating the language so all kids have access to it.

Sensory Integration Treatment Activities in the School/Classroom

- ▶ Occupational therapy treatment can occur in a variety of settings and should always occur in the child's least restrictive environment.
- ▶ Locations can include the playground, lunchroom, bathroom, or therapy room and off-site locations within the community.
- ▶ Interventions can include one or more of the following occupational therapy interventions, preparatory methods, purposeful activities, and occupation-based interventions, depending on the needs of the child and identified outcomes.
- ▶ Occupational therapy services in schools may include consultation or direct service models (AOTA, 2009).

Sensory Integration Treatment Activities in the School/Classroom

- ▶ Incorporate sensory integration and behavioral intervention to support the whole child:
- ▶ Promote physical activities in the classroom/promote whole classroom activities. (Jumping Jacks, Simon Says, Yoga, Whole Class Stretching).
- ▶ Provide alternative seating in the classroom to enhance attention/postural control. (Theraballs, move in sits, wedge cushions).
- ▶ Provide experiences that are rich in tactile, proprioceptive and vestibular input. (Bean and rice bins, sand play, squishing between bean bags or mats, swings).
- ▶ Provide sensory experiences that can be incorporated throughout the day using a visual schedule by taking a sensory break.
- ▶ Use visuals and timers to delineate when the breaks will start and when it will end.
- ▶ Provide choice boards so children can choose what sensory break they would like to engage in.
- ▶ Use self regulation curriculums to manage behavior in conjunction with sensory-based treatment strategies.
- ▶ (Young and Furgal (2016); <http://autismpdc.fpg.unc.edu/evidence-based-practices>)

Self Regulation Tools

- ▶ Visual Supports
- ▶ Visual Schedules- A schedule of a students day, either in picture or word form. Sensory breaks may be incorporated into the students schedule.
- ▶ Working for Strips- A token based strip used for activities. As the student completes a task the student is rewarded at intermittent with a token. A picture or a word of the reward is placed on the strip. When the child fills the card with tokens (usually 3 or 5 tokens) the child earns the reward. The child may work for sensory rewards.
- ▶ Choice Boards: Pictures or words may be placed on a board giving the student a variety of choices to pick from for sensory breaks or sensory activities to work for.
- ▶ Timers: Help to show the child when the break or sensory activity will start or stop.
- ▶ (<http://autismpdc.fpg.unc.edu/evidence-based-practices>)

Self Regulation Curriculums

► The Incredible 5-Point Scale:

- The Incredible 5-Point Scale is a tool based on the use of visual strategies to help children rate their emotions.
- Individuals with autism subsequent sensory processing deficits function best when using visuals and routines (Dunn-Buron & Curtis, 2003).
- The Incredible 5-point scale can be used to help teach children with ASD to recognize different levels of stress and anxiety.
- The scale visually breaks down a child's responses to stress by giving each level a label on what the behavior looks like and what the level feels like.
- The scale gives stress reduction exercises or routines can be used to reduce the stress level of the child.
- (http://www.5pointscale.com/other_projects_article_5-point_scale.htm)

Self Regulation Curriculums

► The Incredible 5-Point Scale:

- Using the scale a child with ASD or sensory issues and subsequent behaviors/anxiety can think in terms of 'being at' a level 1, 2, 3, 4, or 5 using the visual prompts the scale gives.
- Through practice and patience, the child can be prompted to bring their stress level down the numbers, using the scale as a guide.
- The 5-point scale uses cognitive behavioral methods of teaching that teaches the students how to recognize their internal emotional states and then to practice appropriate responses to those emotions.
- The authors of the scale have now have published case studies and objective scientific evidence that CBT does significantly reduce mood disorders in children and adults with Asperger's Syndrome.
- The scale capitalizes on the use of evidenced based visual strategies to teach children with autism and behaviors to manage their emotions .
- (http://www.5pointscale.com/other_projects_article_5-point_scale.htm; <http://autismpdc.fpg.unc.edu/evidence-based-practices>)

Self Regulation Curriculums

► The Zones of Regulation:

- The Zones of Regulation is an emotional regulation curriculum that was designed to help children diagnosed with autism, ADHD, ODD, conduct disorder, and anxiety disorders.
- The Zones of Regulation pairs visuals and cognitive behavioral teaching approaches.
- The Zones of Regulation was initially designed to assist the special education population with emotional regulation, however it was found to be applicable to all students in all settings.
- The Zones can be used with children who are as young as four years old up through adulthood.
- The basis and inspiration for the Zones was the Incredible 5-Point Scale.
- (Kuypers, 2011)

Self Regulation Curriculum

► The Zones of Regulation:

- The Zones conceptual framework that teaches students self-regulation.
- The Zones categorizes the feelings and stress children experience to improve their ability to recognize their own feelings and communicate their feelings in an appropriate way.
- The Zones uses strategies to help children manage their own emotions by helping them move into an appropriate state of emotional regulation.
- The Zones give students and staff common language to talk about emotions and problems.
- The Zones help students gain awareness of their feelings and discuss what is "expected" behavior and "unexpected" behavior given the situation.
- (Kuypers, 2011).

Self Regulation Curriculum

► The Zones of Regulation:

- The Zones capitalize on the implementation of visuals and the ability of the child to learn from visual through the use of colored visuals and color coding, to learn emotions and emotional regulation.
- There are Four Zones: Blue, Green, Yellow and Red.
 - **The Blue Zone:** is used to describe low states of alertness, such as when the child feels tired, sad, sick or bored.
 - **The Green Zone:** is used to describe a regulated state of alertness, such as when the child feels calm, happy focused or content. This zone is optimal for learning in school.
 - **The Yellow Zone:** is used to describe when a child has a heightened state of alertness, however still retains some control. A person may experience stress, frustration, anxiety, excitement, silliness, nervousness and confusion. The yellow zone indicates that the student is starting to lose control.
 - **The Red Zone:** is used to describe an extremely heightened state of alertness or very intense feelings when a child is experiencing anger, rage, explosive behavior, panic and terror. The red zone indicates that the student is not in control of the body.
- (Kuypers, 2011).

Self Regulation Curriculum

► The Zones of Regulation:

- Through using The Zones:
 - Students gain greater awareness of their emotions.
 - Students are given options as to what to do about their emotions to gain control.
 - Students can understand what is "expected" and what is "unexpected".
 - Students can learn how their behavior is affecting others.
 - Students can identify their stress "triggers" and what tools they can use to help manage them.
 - Students can use visual tools to help manage their emotions throughout the day.
 - Reinforcement can be provided to students throughout the for staying in an optimal learning zone.
- (Kuypers, 2011)

Self Regulation Curriculums

► The Superflex Curriculum:

- Is another self regulation tool that capitalizes on the use of visuals to teach children about their emotions and subsequent strategies to manage their emotions.
- The Superflex Curriculum targets flexible thinking, as many children diagnosed with autism and other conditions involving sensory processing disorder can be described as inflexible thinkers.
- The purpose of Superflex is to provide the parent/educator a fun and non-threatening way for students to increase their knowledge of social expectations and create awareness of their own behaviors.
- Superflex also give strategies to the student on how to defeat socially inappropriate behaviors and behave in socially appropriate manners.
 - Sensory Integration Treatment Strategies can be incorporated into these strategies to manage socially inappropriate behaviors.
 - (Madrigal & Garcia-Winner, 2008)

Self Regulation Curriculums

► The Superflex Curriculum:

- The Superflex Curriculum uses Supervillains to teach children about their emotions.
- These Supervillains have names, outfits and characteristics that displays socially inappropriate behaviors.
- The Superhero is Superflex and his job is to defeat each Supervillain.
- These Supervillain all demonstrate behaviors such as: inflexible thinking, the inability to focus, being overly competitive, talking about only what they want to talk about, being grumpy, becoming upset over little things, having too much energy, etc.
- Each character is presented using a direct teaching method, in a fun manner. Many children will identify characters and traits that they see in others around them before they identify with characters and subsequent traits they see in themselves.
- (Madrigal & Winner, 2008)

Self Regulation Curriculums

► The Superflex Curriculum:

- The Superflex Curriculum uses stories, games, cards and activities to teach children about each character and their traits and the negative affects they have on the social world.
- The Superflex Curriculum uses the concept of the Character Superflex to help children defeat their Supervillain and subsequent socially inappropriate characteristics.
- Through the use of direct teaching and visuals, Superflex teaches the child about their socially inappropriate behaviors.
- It allows the child to explore other options to defeat those behaviors, those options are called strategies.
- Sensory integration treatment options can be incorporated into Superflex strategies to allow children choice over what will help them decrease socially unacceptable behaviors.
- (Madrigal & Garcia-Winner, 2008)

Using Self Regulation Curriculums and Sensory Integration Strategies Together

- ▶ The Incredible 5-Point Scale and the Zones of Regulation both lend themselves to capitalizing on the use of visuals to teach children about their emotional state.
- ▶ Sensory Integration Treatment Techniques can be used in conjunction with both of these tools, as both of these tools afford the opportunity to teach children about emotions and emotional management and allow them to choose from sensory strategies represented in a visual manner to help assist with emotional management.
- ▶ The Incredible 5-Point Scale allows the student explore their emotions using numbers, write their feeling down and write down options of how to cope for their feelings. For children who cannot write, picture cards can be used.
- ▶ The Zones of Regulation allows the students to create choices that can be used to help them cope with their emotional states in each zone. These choices can be sensory based. These choices can include swinging, taking a break, resting, listening to music, being squished with pillow, etc. The Zones uses picture cards to visually present this to the child.
- ▶ The Superflex Curriculum allows a place for sensory integration treatment strategies to be incorporated into the curriculum by allowing the student to have choice over which strategies to use to help defeat socially unacceptable behaviors.

More Information on Self Regulation Curriculums

- ▶ **More Information:**
- ▶ More information about The Zones can be found at: <http://www.zonesofregulation.com/>
- ▶ The Zones is in early in research development, however more information on research can be found at: <http://www.zonesofregulation.com/research.html>
- ▶ More information on The Incredible 5-Point Scale can be found at: [https:// www.5pointscale.com/](https://www.5pointscale.com/)
- ▶ More information on the Superflex Curriculum can be found at: <https://www.socialthinking.com/>
- ▶ More information about Superflex Research can be found at: [https:// www.socialthinking.com/Research](https://www.socialthinking.com/Research)

Goal Development

- ▶ Goals should be based on skill deficits and functional outcomes to address shortcomings in the educational environment and the child's deficit areas in daily living activities (Zimmer and Desch, 2012; AOTA 2009).
- ▶ Goals should be functional and measurable.
- ▶ Goals should be related to the child's performance in the general education/special education curriculum/environment.
- ▶ The Zones of Regulation Curriculum also provides sample IEP goals for functional skills for emotional regulation.
 - ▶ These skills increasing emotional regulation vocabulary, increasing the understanding of body language, increasing perspective taking and increasing student's awareness of state of alertness and emotion and how to manage it.
 - ▶ (Kuypers, 2011).

Service Delivery Models/Occupational Therapy Recommendations

- ▶ According to IDEA 2004, Occupational therapy services are appropriate when the skills of the OT are needed to support the goals identified by the team (Case-Smith & O'Brien, 2010).
- ▶ Recommendations should ensure that a range of service options are available to the student.
 - ▶ The range of options include both direct and indirect services.
 - ▶ Direct services are services that are provided directly to the child.
 - ▶ Direct services include providing direct one on one therapy, group therapy, observation, etc.
 - ▶ Direct services should be recommending when the therapist needs to be present for treatment.
 - ▶ Indirect services are provided on behalf of the child.
 - ▶ Indirect service include providing consultation, creating materials, monitoring programs, providing trainings, etc.
 - ▶ Indirect services should be recommended when the therapist is providing instruction to the teacher, staff, creating sensory programs, self regulation materials, etc.

Wrap Up and Questions

- ▶ This presentation was a broad overview of sensory integration and sensory integration treatment strategies.
- ▶ A review of the current literature surrounding sensory processing disorder and effectiveness of sensory integration treatment strategies.
- ▶ A link was made, through the review of literature, for the need to use sensory integration strategies in conjunction with best practice methods.
- ▶ Best practice methods include using visuals, visual schedules, working for strips and behavior interventions.
- ▶ Sensory strategies can be used in conjunction with best practice methods by imbedding sensory breaks into the child's day, using timers and schedules to delineate the start and end to a break, having the child work for breaks and teaching the child behavioral strategies to manage their own emotions.
- ▶ Behavioral curriculums include: Superflex, The Zones of Regulation and the Incredible Five Point Scale.

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