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Center for Independence THROUGH CONDUCTIVE EDUCATION

Helping children on their Journey to Independence.

# Incorporating Sensory Technique in a Conductive Education Program

## The Premise of Neuroplasticity: Rooted in Sensory Integration and Conductive Education

When Ayres first presented the theory of Sensory Integration (SI) she grounded it in neuroscience literature. As a result, neuroplasticity is a conceptual foundation of sensory integration (Lane & Schaaf, 2010 AJOT, p. 375). Neural plasticity is driven by sensation and movement. A sensory signal corrects and adjusts the movement and updates the motor program for correct execution the next time the motor program is used; therefore, sensory information is vitally important in learning movements. If some kinds of sensory signals are less functional, other sensory signals have to be increased to effect optimal learning (Henderson and Pehoski,2006). An occupational therapist uses a controlled sensory environment which can result in a child developing a combination of functional changes, as well as neuroplastic changes in critical cortical regions of the brain (Lane and Schaaf, 2010 AJOT). Similarly, Dr. Andras Peto founded Conductive Education based on the premise of a child's ability to develop alternative neural pathways (neuroplasticity) to achieve orthofunctional outcomes and to promote one's learning. A conductor leads a structured teaching environment in order to access the brain's residual capacity (neuroplasticity), to facilitate learning, and to develop a child's problem solving using compensatory strategies. Thus, it is essential to utilize sensory integration and sensory processing strategies to support a complex, holistic, Conductive Education program. This dynamic pairing of SI and CE exquisitely maximizes the outcomes of a child's potential for learning because Sensory Integration and Conductive Education are both predicated upon the theory of neuroplasticity.

| SENSORY DOMAINS | SENSORY TECHNIQUES APPLIED WITHIN THE CONDUCTIVE EDUCATION CLASSROOM | NEUROLOGICAL FOUNDATIONS & ORTHOFUNCTIONAL OUTCOMES |
|---|---|---|
| Auditory | Therapeutic Listening (www.vitallinks.com) | Within the Conductive Education classroom we value the use of music and rhythm as both motivation tools and a cognitive facilitation to develop intention to initiate movement. However, if a child's ability to efficiently utilize auditory discrimination is not intact, their engagement and interaction will both be negatively impacted (Therapeutic Listening, Frick 2009). The studies that explore the clinical implications of Therapeutic Listening reveal multiple positive gains including improved attention, handwriting, ability to perceive and move through space, enhanced interaction with peers, greater ability to attend to and follow directions, improved sleep and wake cycles, and enhanced communication. |
| Vestibular | Swinging on platform and bolster swings, Sitting or laying over therapy balls during play, balance boards, scooter boards, bosu ball (www.southpawenterprises.com) | The medial longitudinal fasciculus (MLF) is one of the principle pathways of the reticular formation and the vestibular system. The MLF carries cranial nerves III, IV, VI, and VIII, bringing them in close anatomical proximity to each other and making intercommunication very efficient. Vestibular learning activities contribute to postural development by addressing issues with muscle tone, joint stability, and midline stability. In addition, vestibular activities result in binocular coordination to support depth perception, acuity, fixation, and smooth pursuits. These adaptive responses occur with vision using vestibular input because of the interconnection CN III, IV, and VI, through the MLF (Oetter, et al., 2006). Cerebellar function is driven by vestibular input. This area is under activated in children with motor delay, and as the primary rhythm and sequencing center is essential to consider in devising the most effective treatment planning. (Benson , 2010) Within the classroom this is achieved via activities on the platform and bolster swing in varying positions. It can also be achieved by games on scooters as shown above. The dual gain of strengthening postural and core musculature is achieved. |
| Proprioception | Wilbarger approach, Joint compressions, ball play, weighted blankets (www.sammonspreston.com) | The Wilbarger Deep Pressure and Proprioception Technique is a sensory integration technique that incorporates tactile brushing in conjunction with joint compressions. This intervention was developed by Patricia Wilbarger (OT and clinical psychologist). DPPT refines the ability of the central nervous system to use information from the peripheral nervous system more effectively, resulting in enhanced movement coordination, functional communication, sensory modulation, and hence, self-regulation ( Wilbarger, 2009) . Benefits within the classroom include Improved body awareness as well as refined upper limb and bilateral coordination. |
| Oral | Tasting, whistles, instruments, bubbles, resistive biting (www.superduperinc.com) | Due to the primal nature of oral input and survival functions of feeding, respiration and self –regulation, the cranial nerves that serve oral input also have numerous connections with the limbic system. This system is responsible for basic drives which motivate our behavior. Thus, using different things to taste and using whistles improved children's oral motor awareness and they exhibit integrated adapted behaviors, such as, increased speech, improved attention, and trunk and neck control. Likewise, oral input is used to regulate state of arousal. For example, chewing gum or sucking on mints increases an individual's level of arousal; thereby improving attention (Oetter, et al. ,2006). |
| Tactile | Wilbarger approach, messy play, water play, vibration toys (www.ot-innovations.com) | DPPT deliberately pairs tactile input with proprioceptive input. Improved tactile discrimination develops Intrinsic hand muscle activation, dissociation between the ulnar and radial sides of the hand, and promotes In hand manipulation skills. The hand is both a motor and a sensing organ, and there is a tight interplay between these two functions. (Pehoski,2006). This sensory experience is essential for the development of anticipatory grasp control and the ability to grade the force of the grasp (Pehoski, 2006). Tactile information is essential for precise finger movements , while processing proprioceptive information is critical for reaching and handling objects of different weights. |
| Vision | Tracking games, throwing objects into a target, craft activities, reading activities, hand eye coordination games (www.tsbvi.edu, www.perkins.org) | Using a sensory integrative approach, children with cerebral palsy are taught to use meaningful, visual input to develop hand eye coordination to improve grasp and reach patterns, and enhance tool use (writing utensils, scissors, holding a spoon or fork). Motor influences in using visual input develop extrinsic eye movements for divergence, scanning and tracking. Adaptive responses include: binocular coordination to support depth perception, acuity, fixation, and smooth pursuits. These adaptive responses in turn, develop hand eye coordination, binocular coordination, acuity, fixation, and smooth pursuits. Skill development in these areas culminate in: reading skills, far and near copying skills, and improved visual and postural attention (Oetter, et al. ,2006). |

**ASSESSMENT** The Sensory Profile (Dunn, 1994) is a standardized assessment tool that enables professionals to measure a child's sensory processing abilities and the impact this has on functional performance. The sensory profile uses a sensory integrative and neuroscience frame of reference and supports a family centered care philosophy by involving the caregivers in the data gathering process. This tool provides a measure of current performance and a direction for intervention strategies. Learning occurs when a child is able to receive accurate sensory information, process it , and effectively use it to organize behavior (Fischer & Murray, 1991). www.pearsonassessments.com

**CONCLUSION:** Sensory processing should be at the forefront of your task analysis and conductive education program development. It is as critical as the cognitive and motor considerations inherent in the development of the complex program, and essential to cortical mapping and neural plasticity.

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- Therapeutic listening photo courtesy of Sensory Link



Authors : Josephine A. Boggs, MS-OTR, JoAnn459@aol.com , Jennifer Fliegel, MS-OTR, jendanny@sbcglobal.net
Center for Independence through Conductive Education 100 Plainfield, Countryside, IL , USA