Sensory Integration (SI)

Sensory integration (SI) is a therapeutic approach that aims to improve the ability of individuals to process and respond to sensory information from their environment. This approach is particularly helpful for individuals with sensory processing difficulties or sensory integration dysfunction. Sensory integration involves the brain's ability to receive, process, and integrate information from all of the senses, including visual, auditory, gustatory, tactile, olfactory, vestibular, proprioceptive, and interoceptive. When the brain is unable to process sensory information effectively, individuals may experience difficulties with activities of daily living, learning, and social interactions. Sensory integration therapy involves the use of various activities and techniques to help individuals process sensory information more effectively, with the goal of improving their functional abilities and overall quality of life. SI therapy is often used by occupational therapists, physical therapists and other healthcare professionals who work with individuals with sensory processing difficulties.



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Senses

Visual
Eye
This sense is primarily responsible for seeing and processing visual information such as colors, shapes, orientation, and motion. The main visual area of the brain that is in charge of sight is the occipital lobe which facilitates projections that are received from the retina through the thalamus.

Auditory
Ear
The auditory system is responsible for hearing. It is located in the superior temporal gyrus of the brain. Specific sound frequencies are delineated onto the primary auditory cortex, and particular areas in the auditory cortex process change in sound frequency or amplitude, while other areas process combinations of sound frequencies. The area involved with comprehending language is called Wernike’s area and is located in the left hemisphere.

Gustatory
Goose-tators
The gustatory system is the one responsible for taste. It allows us to be able to differentiate between safe, harmful, sweet, and sour foods. The gustatory system is located near the somatotopic region of the tongue, in the insular cortex deep in the lateral fissure with the secondary taste areas in the operculum. The location is folded deeply within the cortex within the lateral sulcus between the temporal and frontal lobes.

Tactile
Tac-tiles
The tactile system is responsible for sending information to the somatosensory cortex through neural pathways to the spinal cord, the brain stem, and the thalamus. The primary somatosensory cortex is the primary receptive area for touch sensations and is located in the lateral postcentral gyrus, a prominent structure in the parietal lobe of the human brain. This system is vital in sensory processing disorder since individuals with SPD have tactile symptoms such as tactile defensiveness or under-responsivity to tactile input.

Olfactory
The Ol' Factory
This system is responsible for processing, discriminating, and enhancing odors. The olfactory bulb is located in the forward part, bottom side of the brain.

Vestibular
Vest-bull
The vestibular system is responsible for balance and orientation in space, providing information about movement and position of the head relative to gravity.

Proprioceptive
Propeller-scepter
The proprioceptive system is the one responsible for the sense of position, location, movement of the muscles and joints, and orientation. Proprioceptive sense combines sensory information from neurons in the inner ear, which facilitates detection of motion and orientation and stretches receptors in the muscles and joints, assisting ligaments in order to facilitate stance during ambulation.

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Interoceptive

Internal-scepter

This sense refers to sensations related to the physiological and physical needs of the body. It provides internal sensors that provide a sense of what the body is lacking or needs. The interoceptive sense works alongside the vestibular and proprioceptive senses to facilitate well modulation sensations.

Considerations

Sensory Modulation

Sensory-satellite Modification

Sensory modulation is the ability the brain has to properly regulate input received. There are three types of sensory modulation disorders: over-responsivity, under-responsivity, and sensory craving.

Over responsivity: exaggerates the sensory input received.
Under responsivity: lacks or insufficient response to sensory input received.
Sensory craving: The nervous system needs intense input for the sensation to be registered properly in the brain.

Therapy Intervention

Therapist

Occupational and physical therapists collaborate with families/caregivers and the interdisciplinary team to determine the needs of the patient and select the specialized evaluation/assessment and individualized intervention plan. As part of the therapy intervention, it is imperative to identify and modify sensory and environmental barriers that limit performance and participation in everyday activities, as well as individual strengths and supports. During the process, the practitioner aids with educating and modeling activities to support sensory, motor, and behavioral needs. As part of the intervention, the practitioner facilitates the process by helping identify and provide adaptive sensory and motor strategies and interventions using a variety of sensory approaches to facilitate full participation in daily routines and social interactions. Additionally, part of the intervention consists of helping raise an individual's self-awareness of the impact of sensory and motor factors on everyday activities and real-life situations and providing ways to counter sensory processing challenges.

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