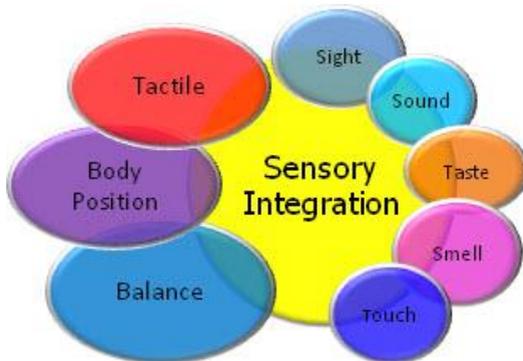


## Sensory Integration

Sensory integration (or sensory processing) refers to the way the nervous system receives messages from the senses (sight, sound, taste, smell, touch, body position and movement/balance) and turns them into appropriate motor (movement) and behavioural responses. When our senses work effectively, we integrate their signals, piecing them together, to give a complete understanding of who we are, where we are and what we are doing, whether you are riding a bicycle, reading a book or sitting at a desk.



### Proprioception

Proprioception is the sense of the position, orientation and movement of parts of the body, with receptors located in our muscles and joints. Proprioceptive feedback, integrated along with tactile information, is required for development of a good body scheme. This enables planning and organisation of movements and the 'programming' of automatic movement patterns such as walking or when holding a pencil to form letters. People with severe difficulties with their proprioceptive system may not know where parts of their body are if they are unable to see them.

Good proprioception allows smooth and coordinated movements with accurate grading of the amount of force to use. Children with poor proprioceptive systems may present as 'clumsy' or 'awkward'.

Proprioceptive feedback helps us to modulate and regulate responses to other sensory information which allows us to focus and control our levels of 'alert'. Therefore proprioception can help to calm children with sensory difficulties.

### Vestibular

The vestibular system, based in the inner ear, monitors head position and the effects of gravity in order to allow our body to respond by adapting our posture to maintain balance whilst still and moving. The vestibular system therefore gives us the ability to move through our environments and against gravity safely and effectively.

The vestibular system influences eye movements (moving our eyes in equal and opposite directions to our heads in order to keep our vision locked on a point), muscle tone (telling our muscles how to work in order to keep us upright) and bilateral integration (using the two sides of our body separately or together to complete an action) and helps organise information from all the senses. The vestibular system helps to control our 'alert' levels, with input helping to increase 'alertness' or to calm us. Slow linear movement tends to calm with rapid rotary movement tending to excite.

## **Tactile**

This system (with receptors being in the skin and mouth) responds to touch, texture, pain, temperature and pressure. It works alongside proprioception in providing the foundation for development of a body map and movement planning. Good touch information is required for fine motor and handwriting development. It is important for regulating emotion and in bonding. Tactile information is also highly significant in defence mechanisms and some children with tactile processing difficulties experience unusual or defensive reactions to non-noxious touch, such as hitting out when bumped or avoiding lining up closely with other children.

## **Auditory**

The auditory system enables us to understand and use what is heard. It is more than just hearing. We use auditory information to discriminate and associate sounds, to make sense of sounds and to remember what was heard. Some children are challenged by noisy environments and situations e.g. lunch halls, swimming pools and noisy classrooms and seek to avoid these. Other children struggle to modulate (respond to) certain sounds/ tone/ pitch/ volume. This means that they need a more intense version of this sensation in order to respond to it.

## **Visual**

Some children can be hyper-sensitive visually so that they are over attuned to environmental stimuli and will therefore struggle to modulate/screen out the extraneous in order to focus on what is important at the time. In order for the child to learn, they need to be able to sustain visual engagement with the relevant information and be able to selectively disregard what is unimportant. If they are unable to do so, they will lose focus and become distracted much more easily or get 'lost' in the big picture unable to process all they see.