What is Sensory processing disorder or Sensory Integration?

Sensory processing (sometimes called "sensory integration" or SI) is a term that refers to the way the nervous system receives messages from the senses and turns them into appropriate motor and behavioural responses. Whether you are biting into a hamburger, riding a bicycle, or reading a book, your successful completion of the activity requires processing sensation or "sensory integration."

Sensory integration is the organisation of sensation for use. Our senses give information about the physical conditions of our body and the environment around us. Sensations flow into the brain like streams flowing into a lake.

The brain must organise all of these sensations if a person is to move and learn and behave normally. The brain locates, sorts and order sensations somewhat as a traffic policeman directs moving cars.

When sensations flow in a well organised or integrated manner, the brain can use these sensations to form perceptions, behaviours and learning.

Sensory Processing Disorder (SPD, formerly known as "sensory integration dysfunction") is a condition that exists when sensory signals don't get organised into appropriate responses. Pioneering occupational therapist and neuroscientist A. Jean Ayres, likened SPD to a neurological "traffic jam" that prevents certain parts of the brain from receiving the information needed to interpret sensory information correctly. A person with SPD finds it difficult to process and act upon information received through the senses, which creates challenges in performing countless everyday tasks. Motor clumsiness, behavioural problems, anxiety, depression, school failure, and other impacts may result if the disorder is not treated effectively.

![Diagram of Sensory Integration](image)

Sensory experiences include touch, movement ( proprioception), body awareness, sight, sound, smell, taste, and the pull of gravity (vestibular). Distinguishing between these is the process of sensory integration (SI). While the process of SI occurs automatically and without effort for most, for some the process is inefficient. Extensive effort and attention are required in these individuals for SI to occur, without a guarantee of it being accomplished. When this happens, goals are not easily completed, resulting in sensory integration disorder (SID).
The normal process of SI begins before birth and continues throughout life, with the majority of SI development occurring before the early teenage years. The ability for SI to become more refined and effective coincides with the aging process as it determines how well motor and speech skills, and emotional stability develop.

What are our senses?
- **Auditory**: investigates how the brain responds to sound
- **Visual**: examines how the brain responds to vision
- **Gustatory/Taste**: the brain's response to various tastes
- **Olfactory/Smell**: the brain's response to information obtained through smell
- **Tactile/Touch**: considers the response to tactile stimuli
- **Proprioception**: The proprioceptive system gives us information about our body position and movement.
- **Vestibular**: The vestibular system engages in a number of reflex pathways that are responsible for making compensatory movements and adjustments in body position. It also engages pathways that project to the cortex to provide perceptions of gravity and movement (balance).

Strategies and Ideas for Sensory Processing Disorder

The following are basic strategies which can be utilised with children exhibiting sensory processing difficulties however please note the professional report (occupational therapist) and their recommendations according to the child’s needs are to be implemented

Sensory Diet, What is a sensory diet?

- Just as a child needs food throughout the course of the day, he/she needs sensory input, and opportunities for getting away from stimulation, spread out over the whole day. A “sensory diet” is a carefully designed, personalised activity plan that provides the sensory input a person needs to stay focused and organised throughout the day. In the same way that you juggle your knee or chew gum to stay awake or soak in a hot tub to unwind, children need to engage in stabilizing, focusing activities, too.

- Arousal is the ability to attend, concentrate and perform tasks in a manner suitable to the situational demands. Just like our body needs food to operate, so does our brain. The food for our brain however is provided through our senses. Arousal depends on the variety of ‘food’ the brain is being fed.

- Our level of arousal and concentration varies, depending on the sensory input (or sensory food) we receive. Sometimes we aren’t receiving enough input so we begin to fall asleep. Other times we receive too much input and are very active. Sometimes we are being active to increase the amount of input. The challenge however is to find the input that will put us at ‘just right.’

- A balanced sensory diet is like a fitness plan. It will enhance every child’s ability to function smoothly. Similar to snacks, some sensory based activities might change our mood or state of alertness for short periods of time. Be being aware of the activities that can alter our arousal level we can adjust it to ‘just right’
Each child has a unique set of sensory needs. Generally, a child whose nervous system is causing her to be hyperactive needs more calming input, while the child who is more underactive or sluggish needs more arousing input. A qualified paediatric occupational therapist can use her advanced training and evaluation skills to develop a good sensory diet for your child. However, it’s up to the parents, teachers, LSE or other professionals involved with the child to implement it every day.

The effects of a sensory diet are usually immediate AND cumulative. Activities that perk up the child or calm him down are not only effective in the moment; they actually help to restructure the child’s nervous system over time so that he/she is better able to:

- Tolerate sensations and situations he/she finds challenging
- Regulate his/her alertness and increase his/her attention span
- Limit sensory seeking and sensory avoiding behaviours
- Handle transitions with less stress.
Examples of strategies

**Alerting (for student with low level of arousal)**

- Crunching: dry cereal, popcorn, chips, crackers, nuts, pretzels, carrots, celery, apples or ice cubes.
- Wash face with cold water
- Bouncing on a therapy ball
- Sitting on a moveable surface
- Jumping up and down on a trampoline
- Rocking on hands and knees
- Rolling inside barrel
- Loud, fast paced, rhythmic music
- Bright Lighting

- Spinning (in place, sit and spin, office chair, merry go round or tire swing). Allow for about 15 revolutions in one direction, take a few seconds and then spin the other direction. (It is very important to monitor spinning activities and ask child's permission before spinning).

- Walking on uneven surfaces to get to and from places in the classroom by using cushions or even a long inflatable raft on the floor to walk over. Outside encourage walking on grass, sand or a ‘clatter bridge’ on the playground.

- Taking frequent breaks during more difficult tasks that require sustained attention (marching, hopping, skipping, jumping and running in place).

- Encouraging an active recess playtime with swinging, running, sliding and climbing.

- Playing with messy textures, such as hand or feet painting.

- Playing games blindfolded, such as: can you feel it-hide small squishy bugs in bean box and have kids find them or show them a car, coin or toy and ask them to find the one that matches in the bean box.

- Dance-Freeze to music.

- Adult affect (tone of voice, facial expression) is high, happy, moving faster, a lot of praise, higher voice that is sing-song “Oh Wow Ben!! You really are a good jumper!”.

- Labelling movement to encourage movement “You are bouncing!”.

- Hanging by arms from monkey bars with supervision then dropping to ground with supervision.

- Games like tug of war, or hot potato with weighted ball.

- A cool classroom is alerting.

- Providing activities to increase intensity, frequency, or duration of sensory experiences.
Providing appropriate channels for needed activity and intensifying sensory aspects of task and context, such as: Alternate active and passive activities in schedule.

Providing socially appropriate outlets for sensory needs, such as helping to run errands, collecting art supplies, moving chairs and desks, and helping to clean tables.

Planning activities that require more sequencing after recess or physical education classes so that movement will stimulate the thinking centres of the brain.

**Calming (for students with high level of arousal)**

Never discipline a “sensory seeker” by taking away break time/PE, this will only lead to intensifying random movements, fidgeting and outbursts.

- Sucking: a hard candy, frozen fruit bar or spoonful of peanut butter
- Sucking thick liquids through a straw
- Drinking from a sports bottle
- Pushing against walls with the hands, shoulders, back, buttocks and head
- Rocking swaying or swinging slowly back and forth
- Cuddling or back rubbing
- Taking a warm bath
- Soft voice
- Warmth – hot water bottle, heated rice pack.
- Rubbing out whiteboard work/running errands to/for other teachers is an excellent strategy for extra movement.
- A few easily accessible squeeze toys can be useful for children who like to fiddle with something in his/her hand. (Toys such as balloons filled with rice, soft squash balls, ‘dog’ tags or koosh balls).
- Hanging by the arms on the monkey bars for 20 – 30 seconds at a time.
- Pushing/carrying heavy objects i.e. books or desks or against a wall.
- Carrying back packs weighted with books. This should be for 15 – 20 minutes at a time with an hour or two in between.
- A reading corner with a bean bag makes a great place to escape from too much stimulation and get ready for more focussed work. (They may enjoy reading or sitting under it more than on top of it).
- Approach from the front to warn the child that touch is coming.
- Firm pressure to shoulder at back is better than a gentle touch.
The child’s desk should be out of the way of traffic towards end of the room so that the child has a good view of those approaching.

Put the child “in charge of” back of line, ensure back of line is not viewed as punishment but place of worth.

Sit at front of class with less distraction or in quiet area when possible.

Diming or turning out lights and use natural light from windows.

Sitting on seat cushion (can be alerting depending on child).

Giving a child a bear hug, cuddling or back rub.

Sucking on a mouth chewy, frozen fruit bar.

Wheel barrow walking (give support under child’s thighs, shoulders slightly bent and fingertip face forward).

Crab walking and balancing bean bags on belly. Tell child to keep bottom up off the floor.

Minimizing extraneous stimuli (noise, visual, lots of kids in one place, etc.) in environment, especially during tasks that are difficult for the child already.

Providing separate or structured spaces that prevent the child from experiencing a lot of unpredictable touch (carpet square for each child at circle, hula hoops or tape mark squares).

Posting daily schedule using pictures to provide structure and expectations clearly.

Taping an alphabet or number strip to desk.

Attaching pictures with words to drawers, bins, shelves and cubbies.

Presenting new activities at eye level and ask child to repeat directions before beginning work.

Avoiding putting posters, pictures, memos in front of the classroom where children need to focus on the teacher.

**Heavy Work**

All students can benefit from movement activities in the classroom that provide input to the proprioceptive receptors in the joints and ligaments. In addition to providing exercise, these types of “heavy work” movements make it easier for the student to focus and attend.

Heavy work activities (i.e., proprioceptive input) are used for children with sensory processing difficulties to help increase attention, decrease defensiveness and modulate arousal; **hence heavy work is safe and can be used from students who have both a high level of arousal and a low level of arousal, to help the student to have a just right level of arousal.**
Proprioceptive input is the performance of tasks that involves heavy resistance and input to the muscles and joints, and is essential in helping our bodies assimilate and process both movement (vestibular) and touch (tactile) information.

Proprioception is a form of sensory input to the muscles and joints that makes us aware of our “position in space” (i.e., where we are in relation to other objects or people). Students who have difficulty interpreting proprioceptive input have trouble grading and planning their movements and regulating their level of arousal.

Heavy work activities include:

1. Whole body actions involving pushing, pulling, lifting, playing and moving
2. Oral actions such as chewing, sucking and blowing
3. Using the hands for squeezing, pinching or “fidgeting”

The following is a list of heavy work activities/proprioceptive activities that may help regulate a student’s arousal level, concentration, ability to fall asleep or sit still and attend to a task.

Keep in mind the type of heavy work activities, timing and duration is most effective when directed by a professional (such as an Occupational Therapist) knowledgeable about this type of proprioceptive input.

**Seated activities**

- Use elastic bands on the fingers and doing “finger exercises”
- Sit on hands
- Chair push-ups
- Prior to seatwork, have student pinch, roll, pull theraputty or squeeze balloons filled with flour. Give student firm pressure on shoulders
- Take chewy candy breaks – such as wine gums or crunchy foods such as dry cereal, vegetables
- Sip from a water bottle with a straw
- Use a beanbag chair in the classroom during silent reading or independent work tasks.

**Whole body activities**

- Place chairs on desks at the end of the day or take down at the beginning of the day.
- Wash desks and/or dry erase board
- Help rearrange desks in the classroom
- Help the gym teacher move mats, hang them up, set-up or take down equipment

*Completed by Elena Zahra, Allied Health Practitioner, Occupational Therapists & Liliana Agius, Senior Allied Health Professional*  
*Occupational Therapist – COPE Sessions 2020*
Carry heavy notebooks to the office or from class to class
Run around the track at school
Have student move several packs at a time of photocopy paper from storage area to the school copy centre
Perform sports activities that involve running and jumping
Have students push against a wall
Star jumps
Animal walks (crab walk, bear walk, army crawl)
Walk up a ramp or incline
Use theraband or tubing attached to a door and pull it, then let it snap.
Two children can play “tug of war” with jump rope or heavy theraband. (If you use the theraband, children need supervision so they don’t purposely let go of theraband and “snap” the other child).
Play a game of “play wrestling”: pushing game where two people lock hands facing each other and try to see who can push and make the other person step back first. Use other body parts also, but be sure to have rules (no hitting, no biting, no scratching, one person says stop then both stop).
Play “row, row, row your boat” sitting on the floor, pushing and pulling each other.
Have two children sit on the floor, back to back, with knees bent and feet flat on the floor. They interlock their arms, and then try to stand up at the same time.
Play jumping games, such as hopscotch and jump rope.
Push on large therapy ball with someone else giving resistance from the other side.

Websites
https://www.youtube.com/watch?v=cSPmGPIyykU
https://www.youtube.com/watch?v=EtuvhQZfmCI
https://www.youtube.com/watch?v=ep8iLnV7JV0
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