

# SENSORY PROCESSING

Sensory processing is a term that refers to the way the nervous system receives sensory messages and turns them into responses. We receive and perceive sensory input through sights, sounds, touch, tastes, smell and movement. Children with sensory processing disorder struggle to process the sensory information from their body. This results in the brain not responding effectively, and the faulty message sent to the body leads to inappropriate responses. Sensory processing signals that don't get organised into appropriate responses can hinder a child's daily routines, and activities are disrupted as a result.

Sensory Processing Disorder can lead to devastating consequences in daily skills, social relationships, behavioural responses, self-esteem and learning. Children with sensory processing disorders may demonstrate difficulties processing information through any of the sensory systems.



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## WHAT IS SENSORY PROCESSING

1. Sensory processing occurs when the brain
2. Receives information from the senses of the body
3. Processes (or integrates) that information
4. Decides how the body should respond
5. Sends the message for the body to respond appropriately

### Sensory information comes to the brain from:

- The eyes (visual information)
- The ears (auditory information)
- The nose (olfactory information)
- The tongue (taste information)
- The skin (tactile information)

### Additional vital sensory information is obtained from:

- The semi circular canals in the inner ears – this is vestibular (movement of the head) information, which tells the brain if and how the body is moving.
- The muscles and joints – this is proprioceptive information (input to the muscles, joints and ligaments), which tells the brain about the position of the various body parts.
- The internal feeling of our nervous system – this is called interoception which tells the body when its feeling anxious or worried, if you are hungry or thirsty, if you need to go to the toilet or if you are feeling sick.

### There Are 3 Subtypes of Sensory Processing Disorder:

#### 1. Sensory Modulation Disorder

A child may be sensory seeking, under responsive AND / OR over responsive to sensory stimulation. Over responsive children are sometimes described as tactile defensive or sensory defensive.

#### 2. Sensory-based Motor Disorder

When the incoming sensory information is not being processed or integrated properly in the brain, the child's motor output is affected. This can result in poor postural control and low muscle tone, problems with bilateral coordination and poor motor planning (dyspraxia).

#### 3. Sensory Discrimination Disorder

Children who have difficulties in this area may struggle to process and understand what they see (visual perception problems), what they hear (auditory perceptual problems) or what they feel (tactile perception problems)

Depending on the level of sensory processing which is dysfunctional, any of the following scenarios can arise:

- A child who is over responsive to sensory stimulation, gets easily over aroused, and lashes out. This is usually described as a sensory defensive or tactile defensive child.
- A child who is lethargic and under responsive to the environment, who seemingly has an attention deficit. This usually described as a lethargic child.
- A child who is “hyper” and hectic, always crashing, bumping, chewing, pushing, wiggling and jiggling. This is usually described as a sensory seeking child.
- A child who struggles to sit upright at a desk, slouches against the wall, and struggles with balance and many gross motor tasks. This child is usually described as having poor postural control.
- A child who struggles with everyday tasks that are appropriate for his/her age, such as tying shoelaces, cutting with scissors, riding a bicycle, bouncing a ball and learning new tasks. This child may be described as having poor bilateral integration (bilateral coordination) or poor motor planning skills (dyspraxia).
- A child who struggles to understand what they see or hear. This child may be described as having a visual perceptual delay or auditory perceptual problems. This child may also be extremely clumsy, always dropping things and bumping into things because of poor tactile perception (touch perception)
- A child who struggles to cross the midline, is late in establishing hand dominance, and who has letter reversals and word reversals may also have an underlying sensory integration problem.



Sensory processing disorders are usually diagnosed by an occupational therapist, and occupational therapy is recommended. An occupational therapist will use sensory integration techniques that are designed to stimulate the appropriate sensory system and prompt the brain to process the information more effectively. If you suspect a child may have a sensory processing disorder, please seek professional advice.

It is important to recognize that sensory integration dysfunction cannot be cured with medication. It is a neurological problem and the underlying processing deficits can be addressed through intervention with sensory integration techniques and therapy. However, there are some helpful sensory integration activities and exercises that parents and/or educators can do, within the child's learning environment, to support and help their children who are sensory defensive, sensory seeking or under-responsive.

## SENSORY PROCESSING DISORDER IN CHILDREN

Sensory processing disorder in children is becoming more recognized among health professionals and educators. These children are often misunderstood and may be labelled as learning disabled, slow, clumsy or naughty. Identifying sensory processing disorder (also called sensory integration dysfunction) is a vital first step towards helping these children to achieve their potential.

Sensory processing disorder in children can be present in any or all of these 3 areas of dysfunction: Sensory Modulation Disorder, Sensory Motor Difficulties and Sensory Discrimination Difficulties. All children (and adults!) may show one or two symptoms at various stages – but when symptoms are persistent and affect the child's functioning at home, at school and socially, then help should be sought from an occupational therapist.

### SENSORY MODULATION DISORDER:

Pre-schoolers may well have the same sensory modulation difficulties as babies and toddlers with sensory processing disorder. In addition, if they are attending school, they may dislike standing in lines because of the jostling and bumping that usually takes place. They tend to overreact to the normal rough and tumble of playground play – the accidental knock feels like being tortured, and they may cry as though they have been stabbed! Sensory modulation problems may also look like an attention deficit disorder, as the child is continually distracted by what he sees, feels, hears and smells or may be seeking in nature, moving quickly from

one thing to another to gain additional sensory feedback to their bodies.

### SENSORY MOTOR DIFFICULTIES:

Sensory processing disorder in children may result in certain developmental milestones being attained slowly or not at all. Sitting, crawling and walking may be delayed, and crawling may often be omitted. These may indicate a problem with low muscle tone and/or bilateral integration.

Gross and fine motor skills may be below their peers, and for example, they may take a long time to learn to use eating utensils, cut with scissors and dress themselves. They may be clumsy and struggle to play games and interact appropriately with other children. This may indicate a motor planning problem (dyspraxia) or bilateral coordination problem.

### SENSORY DISCRIMINATION:

Sensory Processing disorder in children may manifest in delays in auditory perception (understanding what they hear), visual perception (understanding what they see) and tactile perception (understanding with they can feel).

In the absence of a diagnosed hearing loss, auditory perception delays may result in (among other things) a child struggling to remember what was said, confusing similar-sounding words, and struggling to hear the teacher's voice over the background noise in the classroom.

In the absence of a diagnosed loss of vision, visual perception delays may result in (among other things) a child struggling to copy words



from the blackboard, losing his place when reading, confusing similar looking words and letters (eg b, p, d) and battling to do jigsaw puzzles. This child may also find it hard to do regular classroom worksheets such as mazes, word searches and spot-the-differences.

Poor tactile perception can cause a child to be clumsy with the use of his hands, perhaps breaking things as a result of squeezing too hard, or dropping things because of not holding them firmly enough. Tactile Perception delays can make fine motor tasks such as fine craft work and handwriting more difficult, and the child may not be able to identify an object by feel instead of by sight.

#### **In broad terms some of the symptoms or difficulties a child may demonstrate:**

- Heightened response to touch, movement and sound
- Aggressive or impulsive behaviour when overwhelmed by sensory stimulation
- Upset by transitions and unexpected

changes

- Shows no reaction when physically hurt
- Likes crashing, bumping, jumping and rough housing
- Often licks, sucks or chews on non-food items such as pencil, hair and clothes
- Is clumsy, awkward and/or accident – prone
- Has difficulty with personal organisation
- Poor attention and emotional regulation.
- Being a fussy eater
- Poor sleep patterns

(adapted from Miller, 2006)

If you are concerned that a child may have sensory processing disorder, then encourage the parent's child to contact your an occupational therapist for evaluation, treatment and guidance. Early Intervention is the best. The earlier issues are picked up and treated the better the outcomes.

## **SENSORY INTEGRATION ACTIVITIES**

Parents and educators can make use of simple sensory integration activities and exercises to assist children to regulate and calm their central nervous systems. Sensory integration activities are designed to stimulate the appropriate sensory system and prompt the brain to process the information more effectively. This should result in the child responding more appropriately. The activity suggestions below are aimed primarily at children with sensory modulation difficulties, as described above.

### **BASIC SENSORY INTEGRATION ACTIVITIES**

- Ideally, children with sensory processing disorders require 15 minutes of vestibular and proprioceptive input every 3-4 hours to help keep their body engines and levels of concentration at their optimal. In between these times children are encouraged to

do 5 minute heavy work activities, micro movement activities to “feed” their bodies and brain.

- A “sensory corner” can provide stimulation to the under-responsive child, sensory input for the sensory seeking child, and a safe retreat for the sensory defensive child. Make a "Sensory Corner" by blocking off a corner of the room and using soft cushions with a variety of textures. A big comfy beanbag provides wonderful deep pressure and a snuggly effect which can be very calming.
- The use of body socks and lycra tunnels give comfort, pressure and can have a calming influence. A sensory box filled with objects that have different textures and weights can stimulate your child, while some kids find fiddle toys calming. In the beginning offer a variety of objects eg smooth wood, velvet, squishy textures and stretchy objects, until your child discovers their favourite object. A sensory seeking child often focuses better when their hands can fiddle with an object in their pocket!



- Encourage your child to gradually tolerate light touch on the hands by giving a box filled with sand or dried beans in which small objects are hidden. Time your child to see how long it takes them to find the objects! This can also help the child that is tactile defensive; however, with these children start with a medium that is less “prickly” and upgrade to more “prickly” mediums.
- Some children find a lava lamp or fish aquarium soothing to look at, and others appreciate having headphones with which they can listen to soft soothing music.

### “TOOLS FOR MUSCLE INPUT”: PROPRIOCEPTIVE ACTIVITIES

Information from the muscles and joints is called proprioception. Proprioceptive activities can be passive, where deep pressure is given to the child, or active, where the child actively takes part in a heavy work activity. Proprioceptive activities are excellent for sensory-seeking kids who are always craving movement and crashing into things. They can also help stimulate the under- and over-responsive child.

#### Passive Proprioception Activities:

- Let your child lie on a mat or folded blanket and pack pillows on top to make him into a pizza or sandwich.
- Weighted vests, weighted blankets, lap toys and lap blankets are also effective ways to give passive proprioceptive input.
- Your child may also enjoy being wrapped in a blanket or snuggling in a beanbag.
- You can pretend to be a steam roller and roll a fit ball over the top of the child, providing deep pressure.

#### Active Proprioception Activities:

- Heavy work activities help your child to really “feel” their muscles and joints.
- Using a fitball for rolling on, wheelbarrow walking and / or core strength exercises

- Let your child carry groceries, sweep the yard, dig in the garden, or any other activity that lets their muscles work hard.
- Jumping on a trampoline
- Climbing or hanging on playground equipment also gives good proprioceptive input.
- Pushing, pulling and isometric exercises or activities can be muscle stimulating and calming.
- Crab walks or bear walks, wheelbarrow walks and frog jumps can provide good input to the muscles.
- If your child struggles to sit still to listen to a lesson, then try a stress ball to squeeze, chewing gum, or a special chew toy to give proprioception input.

### “TOOLS FOR MOVEMENT (OF THE HEAD)”: VESTIBULAR ACTIVITIES

Most movement activities will stimulate the vestibular system in the inner ear, which helps the body to know how it is moving and how fast it is moving. Depending on their intensity, vestibular activities can be stimulating for an under-responsive child, or calming for a sensory seeking or over-responsive child.

- Trampolines, fitballs, rocking horses, swings, roundabouts or slides are all good vestibular activities.
- A child who is gravitationally insecure may fear movement and avoid escalators, elevators and /playground apparatus. They need to experience very gentle, safe movement. It will be less scary for them to move while sitting or lying down, rather than while standing up, or to try a gentle activity while being held by a parent. Try gentle bouncing on a trampoline while lying or sitting, swinging on a very low swing, and rocking on a rocking horse.

Be careful not to force a fearful child to take part in an activity – be guided by their reactions. This will only do more harm. Vestibular input can cause a heightened response in children



that are sensory-seeking or over-responsive and is to be used with Caution. Speak to your Occupational Therapist regarding your child. Vestibular input is best followed up with heavy muscle work or deep pressure to help ground your child.

## **“TOOLS FOR THE MOUTH”: ORAL MOTOR ACTIVITIES**

A fussy eater may be a child with an oversensitive mouth. Some children chew on clothing, pencils and other inappropriate objects. They are usually seeking tactile and proprioceptive input through their mouths.

- There are a range of oral-motor products on the market that give them the sensations that they crave through chewing, or you can try “Chewelry”.
- Blowing bubbles in a bowl of water with a straw, drinking thick milkshake/yogurt through a straw, blowing up balloons, blowing party hooters and blowing on harmonicas or whistles, can also give calming proprioceptive input. Children need their own personal items, when blowing is involved, as to prevent the spread of germs.
- Use drink bottles with straws or pop tops that require a hard sucking action.
- Activities that require sucking ie using a straw to suck up pieces of paper to spell words, suck up “m&m’s game and transfer from one plate to another, eat yoghurt by sucking up through a straw...
- Foods that are crunchy or chewy can be beneficial to the jaw muscles ie carrot sticks, apples, ice, dried fruit, dried cereal etc o Foods that are spicy, sour and / or salty are good for stimulating the senses

## **“TOOLS FOR THE EYES”: VISUAL MOTOR ACTIVITIES**

A child can often be over-responsive with their visual senses causing high levels of distractibility and sensitivities. They may cover their eyes in the bright light or excessively squint or avoid being outdoors.

- Use plain, light materials to cover any fluorescent/flickering lights
- For kids who are sensitive to light, encourage wearing of hats and sunglasses.
- Have minimal Visual displays in the environment
- Use low watt lighting that’s warm and not too bright
- Position a child in the classroom so that they are not facing windows which may cause distractions ie lots of walking traffic

## **“TOOLS FOR THE EARS”: AUDITORY ACTIVITIES**

Strategies to support the child to manage auditory sensitivities and filtering difficulties, but are not limited to, include:

- Ensure that the child is at optimal level of arousal by addressing sensory needs identified earlier in this report
- Where possible, provide predictability and a plan, or warning for what is planned or about to occur, such as using a visual schedule.
- The use of headphones, to block out the background sound when working, particularly in noisy environments, can be beneficial.
- Do not overload the questions asked. Simple clear instructions need to be provided.
- Limit the number of instructions provided at a time. Three is a good level for processing abilities. Check with the child that he understands the tasks required by asking him to repeat the instructions back. This can gradually be upgraded.
- Enhancing and intensifying the contextual cues in the classroom or when given important information such as writing or drawing the information. Alternatively, give instruction in visual form ie Visual charts or cue cards.
- Assure you have the child’s full attention and



slowing down your speech when giving verbal instructions.

- Limit distractions such as the television or radio in environments where concentration is needed
- Support the child in strategies to limit distraction, such as using fidgets, during listening time.
- Make visual cues more salient by underlining, bolding, highlighting or using colour to emphasise.
- Have a quieter area available for when they really need to focus.
- Use of quiet music and headphones may be beneficial.
- Recording the instructions onto a device or an auditory button (ask OT for stockists) can also be beneficial for the child to be able to have the instructions repeated

### **“TOOLS FOR THE HANDS”: TACTILE SENSORY INTEGRATION ACTIVITIES**

Some children like deep pressure and touch activities as they assist to calm, and settle; lowering the sensory threshold. Light Touch is a different subgroup as it alerts. Light touch for those with low thresholds and over-responsiveness, is alerting and can raise the sensory level nicely. However for the tactile defensiveness child, it can be very distressing and best avoided. Keep this in mind when choosing activities to support children with these difficulties.

- Providing children with a range of different types of tactile fidgets and toys to allow them additional touch input. We are aware that some fidgets are distracting. By changing the name to “focus tool” names the desired reason for its purpose and kids don’t think it’s a toy so much. Choose fidgets that can be used in the lap, that fit in the palm of the hand or can be fiddled with in the pocket, that is not noisy or visually distracting to others. Rules need to be explicitly taught to children around use of the “focus tool”

- Most kids enjoy deep touch sensation and this can have a calming / modulating affect on the body.
- Deep pressure activities may include but are not limited to:
  - Resistive clay / putty,
  - Pillow squash
  - Bear hugs
  - Massage
  - “pizza / tortilla roll ups”
  - Steam rollers
  - Some Fit ball activities
  - Weighted blankets, vests and lap cushions
- Temperature: Hot or cold: Different kids will enjoy temperature input while others don’t like it. Keep the environment at a constant happy temperature. Not too hot and not too cold.
- Cold things can be alerting for some children
- Allowing a child to experience different textures both rough and soft

### **“TOOLS FOR THE NOSE”: OLFACTORY SENSE**

Our noses can be super sensitive to lots of different smells and can sometimes be a trigger for adverse behaviour. This one requires you to put your detective hat and think about what senses are happening in that environment.

- Children like calming and gentle smells like lavender, peppermint or light citrus aromas. Find out what smell works for the child. A drop of this essential oil on a handkerchief can be calming to smell and practise deep breaths with.
- Incense is too strong and often causes a child to be reactive
- When working with children wear a subtle smelling deodorant or perfume.

