



Sleep and Sensory Integration: A Guide for Parents

By

Teresa A. May-Benson, ScD, OTR/L, FAOTA
and Spiral Foundation Interns

About A. Jean Ayres, PhD, OTR, FAOTA, Founder of Sensory Integration Theory

A. Jean Ayres, occupational therapist, developed the sensory integration frame of reference. Dr. Ayres was born in 1920 in Visalia, California. Growing up she struggled with everyday sensations



that interrupted and impacted her ability to learn like her peers. Due to her difficult childhood, Ayres was determined to study the reasons why children like her had such difficulty with everyday tasks. She obtained a master's degree in occupational therapy and a doctorate in educational psychology from the University of Southern California. Dr. Ayres later completed postdoctoral work at UCLA's Brain Research Institute where she began to develop her theory of sensory integration. Through her work, Dr. Ayres found children with sensory integration dysfunction had a neural disorder that affected their ability to interpret and process sensory information, such as touch and movement. From this discovery, she developed assessment tools such as the Southern California Sensory Integration Tests (SCSIT) and

later the Sensory Integration and Praxis Tests (SIPT) that helped occupational therapists identify this disorder in children. She created equipment and treatment techniques, which now serve as the foundation to sensory integration intervention. This novel intervention approach changed the way occupational therapists treat children with sensory and motor challenges. Dr. Ayres believed therapy should emphasize the power of sensations, be child-directed and be play-based to make the neural changes necessary to improve the child's ability to function in everyday life. Throughout the past decades, Ayres' work has been the foundation for increased understanding of the relationship of sensory processing, motor development and behavior in children. Her theory and terminology are used by many professions though they remain rooted in occupational therapy.

Photo A Jean Ayres © Jane Koomar. Used with permission.



SLEEP AND SENSORY INTEGRATION: A GUIDE FOR PARENTS

© 2018 Spiral Foundation at OTA-Watertown

All Rights Reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system, without permission in writing from the copyright owner Spiral Foundation at OTA-Watertown.

Clip art and photographs used in this publication are either royalty free artwork obtained from a legally licensed copy of Microsoft Office Word 2010 for use by a non-profit organization or purchased from www.istockphoto.com, courtesy of andresimaging, EpicStockMedia, a-wrangler, 4774344sean, monkeybusinessimages, Johnnyhetfield, and omgimages.

Acknowledgements: Portions of this publication originally appeared on the Spiral Foundation website: www.thespiralfoundation.org and were adapted from material written for the website by Anne Trecker, MS, OTR/L. We would like to acknowledge contributions by: Linda Tirella, Amy Danato and Emelia Heckman.

Printed in the United States of America

PUBLISHED BY

Spiral Foundation at OTA-Watertown, 74 Bridge St. Newton, MA 02458 617-969-4410 www.thespiralfoundation.org

Table of Contents

What Is Sensory Integration (SI)?	4
How Does SI Impact Sleep?	5
Does My Child Have Sleep Challenges? A Checklist	6
Common Sleep Problems in Children	7
Co-Sleeping	7
Trouble Falling Asleep	7
Sleep Interventions	8
Creating & Maintaining Bedtime Routines	8
Getting Ready for Bed: Calming Pre-Bedtime Activities	9
Changing the Sleep Environment	10
Other Considerations	10
Sleep Strategies	11
Infants	12
Back to Sleep	12
Tummy Time	12
Sleep Challenges and Autism Spectrum Disorder	13
References & Resources: Where Can I Learn More?	14
Appendix A: Assessment Tools.	15

This guidebook was developed to provide an overview of sleep and the impacts sensory integration problems and sensory processing disorder have on sleep, strategies to help change sleep patterns/routines, and assessment tools.

Maybe your child has become socially isolated because the slightest touch feels threatening.

What is Sensory Integration?

Maybe your son or daughter struggles with sleeping and eating and is irritable much of the day. You, as the parent, think that it is only a stage, but that doesn't make it any easier to deal with.

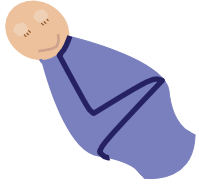
Every day we experience

and interpret sensory information from our environment. This information comes from the senses: sight, hearing, touch, taste, and smell, as well as balance and movement (vestibular sense) and muscle and joint senses (proprioception). Our balance and movement sense allows us to know where we are in space and where our head is in relation to gravity. Our muscle and joint sense allows us to know about how much force we use and where our extremities are in relation to our body. All of these senses provide us with information about our body and the environment around us. The process by which the brain organizes and interprets this information from our senses is called **Sensory Integration**.

For most people, sensory integration develops through typical childhood experiences. Through these experiences, children acquire the ability to interpret, adjust and respond appropriately to incoming sensations. For example, children gain knowledge of their body in space through movement activities such as running, swinging and rolling. This knowledge allows them to navigate their world safely such as being able to safely time crossing a busy street. However, for some people, the ability to integrate everyday sensory information does not develop as well as it should. It can result in long-term difficulties with everyday activities such as work, dressing, eating and self-regulation. When this occurs, the individual has a problem with sensory integration. This problem is frequently referred to as a Sensory Integration or Sensory Processing Disorder (SPD).

Maybe your child is a good student who is determined to work hard but can't seem to stay organized or focused at their desk.

Maybe your child's ears fill with pain whenever the fire alarm rings at school. While everyone else goes outside, all your child can do is curl up with their hands over their ears.



How Does Sensory Integration Impact Sleep?



Sleep is an important part of our everyday lives. Our bodies need sleep in order to stay healthy, think, move, interact, and feel our best. For many people it is difficult to fall asleep, stay asleep, or be comfortable while they are trying to sleep; 30% of children have trouble with sleep (Vasak, Williamson, Garden, & Zwicker, 2015).

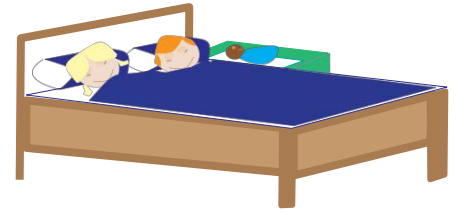
One reason for these difficulties may be related to the way their bodies experience and react to the world around them. Stimuli (such as, sights, sounds, touch) may make it difficult for some children to make their bodies calm and relaxed. Researchers have discovered that there is a significant link between sleep behaviors/patterns and the way bodies experience sensory stimuli or sensations. In particular, research has found that children who are sensitive to sights, touch, movement, and sound have greater difficulty with sleep (Engel-Yeger & Shochat, 2012; Shochat, Tzischinsky, & Engel-Yeger, 2009).

Children with **sensory integration (SI)** needs are more likely to have challenges falling asleep, staying asleep, and/or being comfortable while sleeping. Poor sleep not only negatively impacts the child, but the whole family. If sleep difficulties go unchecked, they can lead to later-life challenges such as negative behavior, poor self-regulation, and depression (Vasak, Williamson, Garden, & Zwicker, 2015). Sleep challenges increase if a child has SI challenges that co-occur with a diagnosis of ADHD, ASD, and/or intellectual disability (Breslin, Edgin, Bootzin, Goodwin2 & Nadel, 2011; Goldman, Richdale, Clemons & Malow, 2012).

Parenting styles, cultural values, sibling interaction, family stress, sleep deprivation, occupational balance , napping, sleeping position, medical illness, sleep disorders, psychiatric disorders, and behavioral/developmental difficulties also impact sleep (Vasak, Williamson, Garden, & Zwicker, 2015).

Does My Child Have Sleep Challenges? A Checklist

The **BEARS** acronym is a very helpful way to check in about your child's sleep:



Bedtime: Does your child have difficulty falling asleep or going to bed by himself/herself?

Excessive daytime sleepiness: Does your child have difficulty waking up or seem groggy or sleepy throughout the day?

Awakenings at night: Does your child wake up at night? Can he/she fall back to sleep by his/herself?

Regularity: What is your child's typical bedtime and wake-up routine?

Snororing: Does child snore or stop breathing, gasp, or choke during sleep?

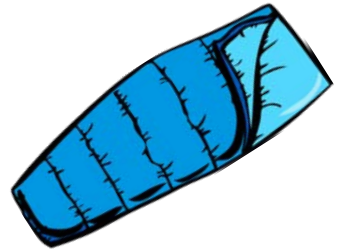
(Owens & Mindell, 2005)

A "yes" to Bedtime, Excessive daytime sleepiness, Awakenings at night, and/or Snoring questions can indicate a sleeping challenge. If your answer for Regularity indicates that your child does not have a consistent bedtime and/or wake-up routine, that can also indicate a sleeping challenge. Some of these sleeping challenges may be related to sensory processing difficulties.

Keep in mind that **snoring** can be due to many different reasons (impacted tonsils or adenoids; a condition such as sleep apnea or asthma). If your child snores, you should bring him to a clinician as soon as possible to determine the best physiological supports for sleep.

Common Sleep Problems in Children

While there are many different reasons a child has trouble sleeping the two main problems parents encounter with their children's sleeping habits are that their child cannot fall asleep and/or that in order to get their child to sleep they must co-sleep with a parent.



Trouble Falling Asleep

Children can have trouble falling asleep for many different reasons including but not limited to, the environment that the child is in, the sleep clothes the child is wearing, the activities done that lead up to bedtime, and the child's habits around falling asleep.

Try to follow different sleep interventions listed on [pages 8-11](#) to see which ones work best for your child and your family.

It is important to give your child the opportunity to learn how to fall asleep independently starting at a young age. Constantly holding or rocking a baby until they fall asleep or sleeping

Co-Sleeping

Many parents find that the only way they can get their child to sleep is by either having the child sleep in their bed or room, having a parent sleep in the child's bed or room, or allowing their child to come into their bedroom in the middle of the night when they wake up. If co-sleeping is absolutely necessary:

- Get a wall barrier for the bed if you have an infant or small child so you do not roll on your baby and possibly smother them.
- Have your child sleep in a sleeping bag or on a portable mattress on the floor of your room instead of directly in the bed with you.
- If the child prefers you sleep in their bed, transition to sleeping on the floor instead.
- Having a bed in an infant's room instead of the infant's bed in your room will make it easier for the parent to move rather than the baby- giving the infant a more restful sleep.

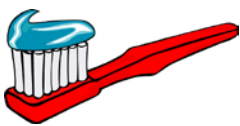
The end goal is to eventually **transition** your child so that they are able to fall asleep in a reasonable amount of time and stay asleep in their own bed independently. Review some of the sleep strategies on [page 11](#) for ideas on how to make this transition for your child.

Sleep Interventions

To change sleep patterns new routines and habits must be formed around bedtime as well as during the time leading up to bed. The environment in which the child sleeps is another important factor to consider. For children with SPD or SI needs, environmental factors around them (i.e sheets or pajamas) can significantly influence their sleep (Miller Kuhaneck & Watling, 2010).

Creating and Maintaining Bedtime Routines

One of the best ways to help support your child's sleep is to create and maintain a bedtime routine (Goldman, Richdale, Clemons & Malow, 2012). Completing a routine before bed is a great way to help the mind and body prepare for sleep. Carrying out a bedtime routine signals the body that it is about to go to bed. It may take some time to figure out what kind of routine works best for you, your family, and most importantly your child. Experimentation, creativity, and flexibility are important in this process. Once you figure out a plan that works for you and your child, stick to it! Consistency is key! The bedtime routine, and time for the routine, should be consistent and should work for all members of the family. The routine can be simple and short. Some examples of types of things to include in a routine include, but aren't limited to:



- drink a glass of water, brush teeth, and put on pajamas;
- do 15 pushups, wash face, and set alarm clock;
- use the bathroom, choose an outfit for the morning, and cross the day off on the calendar.

The best routine for your family is one that includes completing the same set of activities around the same time each night.

Sleep issues can be very stressful for families. It's a good idea to be open to as many suggestions and possibilities as possible.

Getting Ready for Bed: Calming Pre-Bedtime Activities



It is difficult for most people's bodies to suddenly switch from "daytime mode" to "sleep mode." If you find your child puts off going to sleep or lays in bed waiting for his body to feel ready for sleep, some of the following activities may be beneficial. Children with SPD often demonstrate sensory seeking behaviors around bedtime that cause over arousal (Miller Kuhaneck & Watling, 2010). It is important to lower the child's arousal state and to calm him or her down to allow the child to fall asleep and stay asleep. Steps can be taken throughout the day that will help to decrease a child's arousal before bedtime.

The following activities focus on decreasing bothersome or alerting stimuli (sights, sounds, etc.) and increasing calming stimuli/sensations:

- Avoid bright screens (TV, computer, phone, iPad)
- Relax in a dim, quiet space before heading to bed
- Choose a relaxing activity, like reading, drawing, jigsaw puzzle, word/number games (Sudoku, crossword, word search), cards, or knitting
- Listen to quiet music that is soothing
- Wrap body tightly in a blanket or sit under a weighted blanket
- Take a warm shower or bath
- Meditate or do light yoga
- Getting a tight hug from a family member, or roll an exercise ball firmly over your child's back while they lie on a mat
- Rhythmic motion, such as gently rock in a rocking chair, can be soothing.
- Deep breathing or sucking may help the body feel more calm and ready for sleep; for example, blow up a balloon several times, drink room temperature water through a straw, or suck on a sugarless mint.



Heavy work activities may be helpful if your child feels the need to move before going to bed. For example, doing laundry, wall pushups, manipulating clay/putty, or tossing and catching a weighted ball can be calming.

Allow for plenty of movement opportunities throughout the day for the child. For example, running, jumping, and swinging.

Changing the Sleep Environment

The environment plays an important role in how the body feels, responds, and completes activities throughout the day. Bedtime and sleep are no exception. Especially for children with SI the environment before bedtime needs to be as optimal as possible for the child. The following list provides some suggestions for creating an environment for sleep that may help your child fall asleep faster, stay asleep longer, and experience sleep more comfortably:

- Paint your child's room a color that he/she finds soothing.
- Hang room darkening shades/curtains if light bothers your child.
- Make the bed with sheets and a quilt/comforter that are a soothing, solid color or have a simple pattern.
- Close the door to the bedroom to reduce light and sound.
- Play/listen to a soft, soothing noise (if noises are not bothersome or distracting), such as: music, sound machine, fan, air purifier.
- Sleep under a heavy quilt, comforter, or blanket – the deep pressure can be soothing.
- Tuck the sheets under your child's mattress on one or both sides; this can provide soothing deep pressure.
- Sleep with a body pillow, pet, or stuffed animal in the bed – it can provide deep pressure or a sense of boundaries in a large bed.
- Use 100% cotton or flannel sheets and launder them with short wash cycles to avoid pilling.
- Wash new sheets and pajamas several times to make the fabric feel softer.
- Put sheets and/or pajamas in the dryer five minutes before bedtime- the warmth can be soothing for some children.
- Keep the room cool. A decrease in body temperature signals the transition to sleep.

Other Considerations

- Parents and families may have different thoughts about co-sleeping.
- Considerations for co-sleeping include keeping a distinct space in the parents' room for the child to use to help transition out of the parents' bed (e.g. crib, sleeping bag).
- Adopted children may need additional emotional supports for sleeping.
- If your child uses a CPAP machine, build the CPAP machine into your bedtime routine.
- Children who have experienced trauma may have individualized needs to feel safe while sleeping (e.g. need a door open or a night light on).



Sleep Strategies



Sleep challenge	Strategy
Child and parent share a bed to get child asleep and to stay asleep.	<ul style="list-style-type: none"> Put a shirt or other article of clothing that was worn all day by a parent on the child's pillow or anything else they sleep with at night (i.e. stuffed animal) as the parent's scent maybe comforting
Child is afraid to sleep alone in his/her bedroom.	<ul style="list-style-type: none"> Pick a special stuffed animal and give it "special powers" that will scare off any monsters and protect the child as they sleep
Child wakes up in the middle of the night.	<ul style="list-style-type: none"> Provide child with a deep touch pressure massage. Reduce pressure as the child begins to fall asleep.
Child is sensitive to the fabrics of their sheets or pajamas making it hard for them to fall asleep.	<ul style="list-style-type: none"> Use 100% cotton bedding (especially sheets)- wash the sheets a few times before putting them on the bed to soften the fabric (flannel may be particularly useful) Make sure the child's pajamas are soft as well by washing them a few times before wearing and make sure to cut all tags off
Child is restless and overactive due to high arousal level.	<ul style="list-style-type: none"> Consider getting the child a weighted blanket to sleep with- this will provide constant deep touch pressure to calm the child. Get the child spandex pajamas or sheets- both or either will also provide deep touch pressure Put a body pillow or two in the bed to allow the child to be able to "squish" themselves between them Position the bed against a wall so the child can squish themselves against it Have the child sleep in a sleeping bag to create a squishing sensation- add a body pillow in for extra deep touch pressure

Infants

Although many parents are afraid to place their infant on their stomach it is important for babies to spend time in varied positions including both on their stomachs and their backs.

Back to Sleep

The Back to Sleep campaign encourages parents to place their child on their back when they sleep to help prevent sudden Infant Death Syndrome (SIDS). While this initiative has saved lives, it has contributed to sleeping problems, fine and gross motor coordination delays, postural control difficulties, and reflux. The supine (on back) sleep position is most important for infants up to four months of age and those vulnerable to prematurity, illness, or other factors. Babies may have trouble adjusting to sleeping on their backs after being in the womb for nine months. The following list of suggestions can help your infant adjust to sleeping in this position:

- Use a crib wedge against the baby's back.
- Swaddle the baby at night (recommended up until five months or until the baby begins to roll around).



Be sure to change your child's head position each night so they do not acquire a flat head.

Tummy Time

For infants, being able to spend as much time as possible on their stomach throughout the day is crucial to their development. Placing your infant on their stomach while they are awake and under supervision and having them stay in that position allows for the development of shoulder stability along with their neck and back muscles. Being in the prone position also starts to encourage the child to move around.

To encourage your child who is protesting tummy time, place them on your stomach so you and the child are face to face.

Use as much time as possible engaging and playing with the child while they are on their stomach.

Sleep Challenges and Autism Spectrum Disorder

While sleep challenges are common in approximately a quarter of typically developing children, between 40% and 80% of children diagnosed with autism spectrum disorder (ASD) have reported sleep challenges (Cortesi, Giannotti, Ivanenko & Johnson, 2010; Goodlin-Jones, Tang, Liu, & Anders, 2009; Krakowiak, Goodlin-Jones, Hertz-Picciotto, Croen, & Hansen, 2008). These children often:

- Have trouble falling asleep
- Do not sleep the appropriate amount of time for their age
- Wake up frequently after falling asleep
- Are awake in bed more than they are asleep
- Take a long time to calm/settle down before bed
- Get out of bed to play
- Snore, stop breathing, gasp or choke during sleep

If your child does/has any of these sleep challenges then it is most likely affecting their functioning during the day and could contribute to (Mazurek & Sohl, 2016):

- Trouble focusing
- Trouble controlling impulses
- Increased irritability
- Increased aggression
- Increased repetitive behaviors
- Difficulty communicating

It is important to establish a routine with your child before bedtime that consists of calm, relaxing, and quiet activities. Routines should vary slightly to keep your child from becoming stuck on a specific routine (Miller Kuhaneck & Watling, 2010).

Children with Autism Spectrum Disorder react well to positive routines. Creating these routines along with other positive reinforcement will help your child get more sleep (Miller Kuhaneck & Watling, 2010).

Resources & References: Where Can I Learn More?

Websites on Sensory Processing Disorder & Sensory Integration:

- **The Spiral Foundation:** www.thespiralfoundation.org
- **Sensory Processing Disorder Foundation:** www.spdnetwork.org
- **SI Global Network:** www.siglobalnetwork.org
- **Sensory Processing Resource Center:** www.sensory-processing-disorder.com

Breslin, J.H, Edgin, J.O., Bootzin, R.R., Goodwin, J.L. and Nadel, L. (2011). Parental report of sleep problems in down syndrome. *Journal of Intellectual Disability Research*, 55(11), pp. 1086-1091 doi: 10.1111/j.1365-2788.2011.01435.x

Goldman, S.E., Amanda L. Richdale, A.L, Clemons, T. & Malow, B (2012). Parental sleep concerns in autism spectrum disorders: Variations from childhood to adolescence. *Journal of Autism and Developmental Disorders*, (42), p. :531–538. DOI 10.1007/s10803-011-1270-5

Engel-Yeger, B., & Shochat, T. (2012). The relationship between sensory processing patterns and sleep quality in healthy adults. *Canadian Journal of Occupational Therapy*, 79(3),134-141. doi: 10.2182/cjot.2012.79.3.2

Miller Kuhaneck, H., & Watling, R. (2010). *Autism: A comprehensive occupational therapy approach*. 3rd edition. Bethesda, MD. American Occupational Therapy Association, Inc.

Owens, J. A., and J. A. Mindell. "Take charge of your child's sleep." *New York, NY: Marlow & Company* (2005).

Shochat, T., Tzischinsky, O., & Engel-Yeger, B. (2009). Sensory hypersensitivity as a contributing factor in the relation between sleep and behavioral disorders in normal school children. *Behavioral Sleep Medicine*, 7(1), 53-62, doi:10.1080/15402000802577777

Vasak, M., Williamson, J., Garden, J., & Zwicker, J. G. (2015). Sensory processing and sleep in typically developing infants and toddlers. *American Journal of Occupational Therapy*, 69, 6904220040. doi.org/10.5014/ajot.2015.015891

Appendix A

Sensory Integration & Sleep Assessment Tools

Below are some assessment tools your occupational therapist may use to help identify factors that may contribute to your child’s sleep problem.

Infant/Toddler and Child Sensory Profile

A parent/caregiver questionnaire used to help determine a child’s sensory processing characteristics. The Parent/caregiver uses a 5-point scale to rate the frequency of a behavior (e.g., “My child gets fussy when exposed to bright lights”) on a 5-point scale. The ITSP asks questions that cover all senses. The results of the questionnaire indicate how a child recognizes (registers) and responds to stimuli. For instance, a child can have low or high registration, and seek or avoid stimuli.

Brief Infant Sleep Questionnaire

The BISQ asks parents/caregivers 15 questions about the sleep behavior of their child(ren), including questions about the amount of time the child sleeps during the night, the amount of sleep the child gets during the day, the average time the child is awake during the night, and the time it takes the child to fall asleep once she is put to bed.

Children’s Sleep Habits Questionnaire

The CSHQ is similar to the BISQ, but for an older age group. It is also a parent/caregiver questionnaire, asking 45 questions about a child’s sleep habits, rated on a 3-point scale (1 = rarely, 2 = sometimes, 3 = usually). It measures sleep anxiety, sleep duration, sleep onset delay, night wakings, bedtime, disordered breathing, parasomnias, and daytime sleepiness. It also asks the parent/caregiver to label the behavior as a problematic or not problematic.

****Note:** There are many standardized assessments available. These are commonly used tests but this list is not inclusive of all possible assessment tools. Your clinician will select assessments individually focused on your needs.