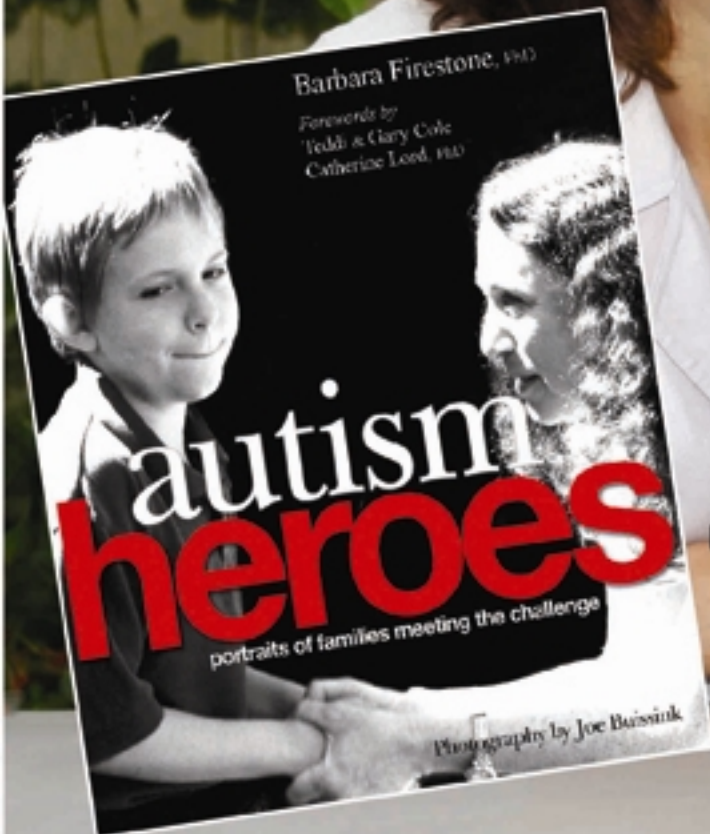


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The **AUTISM** magazine  
TAP INTO IT.  
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Barbara Firestone, PhD  
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The Help Group*



dr. barbara firestone  
talks to  
**families meeting  
the challenge**

# SENSORY TIPS

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## Lesson Four

### The Proprioceptive System

*Sensory Tips is designed to help parents and teachers understand how to use a sensory approach to “see” children and interpret their actions. Understanding a child’s sensory processing system can help parents and teachers create homes and classrooms that offer children safe and respectful environments, which are necessary for optimal learning and behavior. It is also designed to help parents and teachers understand what can often be confusing and disturbing behaviors.*

**T**here are three sensory systems that work together to create the basis for optimal development of the child’s sensory and motor systems: the vestibular system, the tactile system and what we’re going to discuss in this article which is the proprioceptive system. As stated in previous articles, the vestibular sensory system located in the brain is the foundation for a child’s ability to be able to coordinate both sides of their body, the muscles of their eyes, achieve postural tone, and attain optimal arousal states for learning. The tactile or touch sensory system located in the skin is the foundation for “praxis,” or a child’s ability to initiate and execute a motor plan for all tasks requiring movement. The proprioceptive sensory system is located in the muscles and joints and is responsible for refined fine and gross motor movements, necessary for printing, reading and sports.

A child who has difficulty processing proprioceptive sensory stimuli often moves constantly, and often uses “momentum” and

fast movement to compensate for the inability to execute refined gross and fine motor movements. Children with proprioceptive sensory processing difficulties will often be observed running constantly, with their upper body leading their lower body, bumping into objects and people as they move quickly through their world. These children often like to employ “crash and bump” techniques to increase proprioceptive stimuli, which helps determine their position in space. It’s important to realize that these children are not “dumsy,” but are instead seeking the type of sensory stimuli that they need in order to achieve competence in fine and gross motor tasks. Children with difficulty processing proprioceptive sensory input often are poor printers, as their poor position sense impedes their muscle’s ability to “know” how to execute motor plans necessary for stroke, shape and letter production.

The proprioceptive system works closely in conjunction with the tactile and vestibular sensory systems to allow a child to achieve a

“sensory foundation,” or an ability to know where their body is in space and in relation to other objects. Children with difficulties processing proprioceptive sensory information will often be observed “seeking” this type of stimuli through pushing, pulling, lifting or carrying heavy objects. Sensory seeking works to “ground” a child’s energy, thus helping that child to feel centered and in their body. Proprioceptive stimulation therefore can have a calming effect on a child, as well as improved performance in both fine and gross motor tasks.

The proprioceptive system develops when a child performs “heavy work,” such as rolling over as an infant, pulling to a standing position as a toddler, or rough house or explorative play as a child. While recent development of devices and techniques (such as child restraint seats) have markedly improved our children’s safety, they have inadvertently played a part in contributing to the developmental delays that we are observing in today’s children. For example, the Back

to Sleep Program developed as an intervention for Sudden Infant Death Syndrome has resulted in parents being afraid to place their children on their stomachs during the daytime. While it is imperative that parents follow the Back to Sleep Program guidelines while an infant is unattended (such as nighttime in a crib), infants do require extensive "tummy time" when they are up during the day under a parent's supervision. Tummy time causes a child to utilize their proprioceptive system as they push up off their tummies to look around and see their world. Tummy time also provides deep pressure stimuli to an infant's tactile or touch receptors, necessary for attaining eventual praxis and motor planning. If an infant does not receive adequate amounts of tummy time, the proprioceptive system misses a critical element in development.

While well meaning parents often try to make their infant's or toddler's life easier and more stimulating by placing them close to toys, mobiles and TV, they deprive them of what they need for optimal sensory and motor development. Children need to move, touch and explore their environment, and when restrained from doing so, it will create development delays. While we need to keep our children safe and happy, there are many other ways that a parent can promote proprioceptive stimulation: creating a game by placing a toy slightly out of their infant's reach; not picking up a toddler when they take a non-harmful tumble, but instead gently encourage the toddler to get up on their own; not overdoing child-proofing of homes (leave the safety lock off the pots and pans cupboard to optimize a child's exploration.

As toddlers grow into children, rough play is essential for proper proprioceptive system development. Running, climbing, jumping, hanging and swinging are all essential for proper motor system development. These aforementioned play tasks stimulate the muscles and the joints, providing an adequate "body map" for the child,

and a "grounding" of their energy body. If we think back 100 years ago regarding child development, we realize that an integral component in the development of today's child is different. Today's children have far more physical restraints (e.g., infant seats, cribs, TV and videogames), and are far more sedentary than they were a hundred years ago. While these restraints may be working to keep our children more safe, they are negatively effecting our children's sensory and motor development. Recent North American studies regarding TV and videogame use indicate that infants between the age of 0 and 2 watch approximately two hours per day, ages 2 to 5 watch approximately 4.5 hours per day, and elementary children watch 6.5 hours per day. While Sesame Street and Baby Einstein may be entertaining to your

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infant, toddler and child, they are detrimental to their sensory and motor development. Studies are now showing that every 1 hour per day that a child watches TV or plays videogames increases that child's chance of having attention difficulties by 10% when s/he reaches school age. The American Academy of Pediatrics recommends that children should not watch more than 1-2 hours per day of TV and videogames for optimal neurological development.

So, how can we increase proprioceptive stimulation to attain optimal sensory and motor system development? For infants, make sure they have lots of supervised tummy time and learn to roll over and make movements by themselves, as opposed to

having the parent make all movement easy for them. For toddlers, it's important to create a safe environment for exploratory play where they're encouraged to run, jump, swing, climb and hang. Playground climbing frames with cargo ropes, climbing ropes, slides and swings all work towards stimulating proper proprioceptive sensory system development. For growing children, proprioceptive input can be achieved through outdoor play, bike riding, building forts, climbing trees, dancing, wrestling and rough play with siblings and parents, as well as playing outdoor games such as Tag, Capture the Flag, Hide and Seek.

Parents often ask why children need to run around prior to bed. This is a child who is seeking proprioceptive input in order to calm themselves in preparation for eventual sleep. Rather than letting a child run all over the house, a far more effective technique can be employed if parents make sure the child receives the necessary proprioceptive input through a "heavy work" type of play, such as having the child climb up onto the parent's shoulders, arm wrestling, floor wrestling, climbing up a suspended rope, swinging from a trapeze, and doing chin-ups using a chin-up bar. These will ground a child's energy and create a calm state for sleep. Parents should not allow their child to watch TV or play videogames prior to sleep. **TAP**

*Cris Rowan has been an Occupational Therapist for 20 years, working in schools as a pediatric OT for the past ten years. Cris has recently developed two new educational programs, Zone'in and Move'in, for use in schools and at home. Zone'in is derived from Sensory Integration theory, and helps children get their energy "Zone'in to Learn." Move'in is based on Fine Motor Development theory and is designed to help children print and read by taking them on a "Printing Adventure." You can find out more about these programs by visiting the Zone'in website at [www.zonein.ca](http://www.zonein.ca).*