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The Tactile System

This is the fourth article in a six part series called "Sensory Tips." Sensory Tips is designed to help parents and teachers understand how to use a sensory processing 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.

Quite simply our skin is the most basic and easy to understand sensory system. Covering every square inch of our body, our touch system is highly sensitive and therefore highly reactive to changes in our environment. Our skin has a number of different types of receptors that detect changes in pressure, temperature, pain, as well as different types of touch sensations. Generally speaking these receptors are called tactile receptors and carry information to the brain regarding the quality or quantity of sensation, and then the brain interprets this "message" and decides how to respond.

The touch system is very important in infant and child development, and subsequently many factors can cause abnormal development of the tactile system. We've known for many years that in vitro exposure to drugs and alcohol can create a tactile defensive child, requiring early intervention by Occupational Therapists in the area of tactile desensitization. We also know that children with Autism, Asperger's, ADD and ADHD, as well as some children with learning disabilities also have a tactile sensory system impairment causing a whole host of problems during a child's early years, but especially when that child reach's school age. Children with tactile impairment often demonstrate symptoms of fright, flight or fight when exposed to "unexpected" touch, an often confusing response for parents to teachers. These children don't like labels in clothes or anything "tight", and prefer loose sock and pants. Tactilely sensitive children also hate to have their teeth brushed or their hair brushed, and tend to be very picky eaters with what seems to be rather strange requests, e.g. liking one shape of noodle vs. another. While all noodles are noodles, they do have different textures, and some children just cannot tolerate specific textures of food in their mouth. Children with tactile impairment will react negatively to any unexpected touch. As their sensory system does not modulate or filter sensory information accurately, their brains interpret some stimuli as being noxious or harmful, when it appeared to the parent or teacher as benign. By grade one and two, these children often become the victims of bullies as other children find it quite fun to poke or prod these kids from behind and watch them "freak out". When these children reach adolescence, dating and even hanging out with friends can become an issue that creates serious social problems for these children.

While we do find organic problems for tactile impairment, the most common cause of children's inability to process through their touch system is the extensive use of TV and videogames (TVVG). TVVG use is creating a society of children that show signs of sensory deprivation, quite similar to those found in children who are touch deprived from being raised in orphanages in third world countries. As touch is integral to normal sensory and motor development, a child who is touch and movement deprived (such as children who watch the national average 6.5 hours per day of TVVG), will not only show symptoms of sensory deprivation, but as well have great difficulty in school.

As reported in the last Autism Perspective Article on the Vestibular System, normal sensory system development requires the integration of three different types of input: tactile, vestibular and proprioception. With adequate amounts of these three different types of sensory input, a

child is able to develop praxis, also called motor planning, which is necessary for execution of any motor task. Developmentally, praxis has its origin in the tactile system, as our tactile system gives us continuous feedback to refine whatever task we are engaged in. Let's imagine for a moment about a child who sees a toy across the room, and wants to go and pick it up. The first part of praxis is that a child needs to develop is an idea in his or her mind about how to enact or initiate that movement. This is called ideational praxis. TVVG use has caused extensive impairment in children's ability to create ideas of what they would like to do. What they've been exposed to on TV and through videogame use is a 2D image that has very little basis in reality, and isn't at all useful when a child is trying to use feedback from previous experience to create an idea regarding completing the task. Many children have difficulty developing these ideas regarding tasks, and require a continuous feedback loop which shows them in their mind the task over and over again to be able to initiate movement. Once an idea is formulated, children need to be able to send a message to their muscles to start them moving in the right direction. Again once movement starts, the tactile system is giving feedback to the brain regarding foot placement on the floor, sensation of air moving along the skin giving the child a sense of movement, and the movement of clothes along the skin. Children "feel" what it's like to do a task through their tactile system, and therefore adequate tactile systems allow children to learn motor movements.

The final stage in praxis is to be able to complete movements. When execution is performed over and over, the task becomes engrained from conscious memory and is developed into a proficient motor plan. For parents and teachers to be able to fully understand the tactile system information and praxis (also called motor planning), go and get a paper and pen and write your name. Now write your name backwards. You have just been asked to do something for which you do not have a motor plan, and likely you found this quite difficult. Now, if you were asked to write backward all day while at work, you would become highly frustrated until such time as you accomplished sufficient feedback in order to establish this motor plan to a subconscious act. This is what it's like for many of our children who have praxis and motor planning difficulties. Please... remember this experience.

So what can we do to help? It's like we have to help these children discover that their skin that they've been encased in for however many years, is actually theirs! Many children with touch system impairment explain that they don't feel like their skin is their "own". They describe that they feel as if bees are biting them, or they've got a million mosquito bites that they can't scratch. For women, equate these descriptions to trying to break in a new bra with a very firm under-wire, or for men wearing a pair of underwear that is far too tight and pants that are cutting everywhere that you don't want them too. Following this case scenario, by the end of the day any adult would be frustrated, agitated and generally miserable. Fortunately as adults we can remove these garments, but these children can't remove their skin. What we do to help these children is to give them lots of deep pressure input into their sensitive skin in order to help them start to ground their energy and feel comfortable in a place that they've always felt was alien. A helpful technique is the "shoulder squeeze", which is placing your hands firmly on their shoulders with the outside arm pressed firmly on the child's upper back and creating and "in and down" pressure. As with any sensory strategy, it's very important for the teacher or parent to first ask the child's permission "Would you like a shoulder squeeze?", and then approach child from the front so they can see what you're doing, and initiate a gentle squeeze, always watching the child for an adaptive, or positive response. Other useful techniques are to have the child lie on their stomach and roll a therapy ball firmly over their backs, create a squeeze between two beanbag chairs, wrap the child tightly in a blanket and create a "sausage roll", have the child lie between the couch base and the cushions, or the box spring and a mattress and place firm pressure on child's skin. All of these techniques are to be done with the child's permission, as well as continually looking to the child for an adaptive response indicating that the child finds these techniques pleasurable. At no time should these techniques ever be initiated on a child who resists them, as to be effective, the child should enjoy them! A child who resists these techniques likely requires referral to an Occupational Therapist trained in Sensory Integration therapy for further assessment and specific interventions. Sports activities might include swimming which creates deep pressure to the whole body or rough housing and wrestling with siblings.

The neurophysiology behind deep pressure is that stimulation of the tactile mechanical receptors can induce a calming effect and help a child's body relax. A huge help for these children would be to unplug the TV and videogame stations and teach them how to play outdoors, roll on a grassy hill, climb a tree, build a fort or cave, play interactive games (tag, capture the flag) or swim which all stimulate the tactile receptors and develop praxis. Parents and teachers working with children in this way will enable children to reconnect with their bodies, others, nature and you!