

The Vestibular System

With Play2Grow Pediatric Therapy

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What do you feel when you're sitting on a swing or lying in a hammock? Have you ever felt off balance or lightheaded when riding in a moving vehicle, an amusement park ride, on a bus or train, or on a boat? Right now as you read this, are you sitting, standing, or lying down? How do you know that? One way for you to know the answer these questions is to understand your body's position in space. The *vestibular system* is responsible in helping us to understand movement in relation to gravity. It is how we understand our body's position in space. The vestibular system gives us feedback on our body's posture, movement, and balance.

Although it may not be one of the senses or sensory systems you are most familiar with such as sight, sound, touch, smell and taste, the vestibular system is one of the most important sensory systems. It also plays a crucial role in your child's overall development. The vestibular sense of movement not only facilitates posture, movement, balance, and gross motor development, but it also plays a major role in linking other sensory systems together to effect many other neurological systems in the brain. The vestibular system can impact visual development, auditory processing, touch processing, and the overall regulation of the central nervous system. Without the vestibular system, it would be difficult to navigate our environment based on seeing, hearing, and touching alone because the vestibular sense is what truly "glues" all the other sensory input we receive together.

The vestibular system allows us to orient ourselves to our environment. The vestibules located in the inner ear detect motion as we move. When motion is detected, the vestibules send the brain information to help us move our body through space against gravity. Along with the help of our other senses, including the proprioceptive system, we can more clearly sense our movement. It helps us to determine the direction and speed of our movements. However, what makes the vestibular system so important is that while we move, it also helps us to make automatic postural adjustments to maintain the balance required for the everyday activities in which we participate.



For example, take the movement patterns required of walking on sand. Without vestibular input, just seeing and touching the sand alone cannot teach our bodies how to make the appropriate movement adjustments to safely navigate ourselves through the sand to find that perfect spot on the beach. The vestibular system integrates what we see through our eyes, feel in our muscles and joints, and senses how the body sinks into the sand. It helps us to make the right adjustments to move our legs and feet through the sand and helps us to keep our balance and not fall over, or get stuck in the sand.



Play2Grow Pediatric Therapy, Inc.

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Types of Vestibular Movement

Haley's Joy® On-the-Go-Swing



Fold and Go Trampoline™



Spin Disc™



Gymnic® Physio Roll



Because of the vestibular system's ability to integrate our other senses together, it has a powerful effect on our nervous system. The impact of the vestibular system is so powerful that it can affect the body in variety of ways. It can be calming and soothing to the body so much so that it can lull you to sleep, or it can be so overpowering that you may get nauseous and physically sick.

In occupational therapy (OT), your child's therapist will use vestibular stimulation to either activate or desensitize the vestibular threshold depending on your child's individual sensory system. The examples to the left may be common vestibular activities utilized in OT services with children. Your child's occupational therapist is trained to make sure to provide *the just right amount* of vestibular input so as to not overwhelm the system. This helps the body to create an adaptive response! An *adaptive response* occurs when a child can intake and process sensory input that is usually triggering to the sensory threshold and maintain continued functional participation in the activity without demonstrating emotional distress or behavioral responses associated with the sensory input. The goal of sensory integration is to create multiple adaptive responses across time to improve one's overall self-regulation in everyday activities.

It is also important to understand that the *types of movement* we use can result in different responses too. For example, anterior/posterior movement that is back-and-forth, or lateral movement that is side-to-side can be calming and soothing to the vestibular system. Rotary or round-and-round movement can be alerting and stimulating. *Speed of movement, changes of direction, and changes in motion* are also important like fast or slow, left or right, or start and stop respectively. Try and offer your child a variety of such movements to help him/her to integrate a variety of vestibular information. The next page will give you some examples vestibular activities you can do at home.

But be careful when playing with rotary movement and be sure use with caution! Why? Well, the vestibular system offers up a clue... *postrotary nystagmus*. It is rapid side-to-side movements of the eyes that occurs after an imbalance is created within the vestibular system though rapid rotation of the head. For you, it may be perceived as a sense of dizziness. However, research shows that many children with vestibular processing difficulties have depressed or prolonged postrotary nystagmus responses! If you cannot see postrotary nystagmus right away or see a sustained postrotary nystagmus response with rotary movement, stop and take a break. ***Too much rotary movement can cause inability to concentrate, behavioral changes, dizziness, nausea, and physical sickness!***

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Vestibular Activities



- Help your child with rolling back-and-forth on the floor
- Hold your child in your arms and sway to music
- Hold your child and rock back-and-forth in a rocking chair
- Take your child for a ride in his/her stroller
- Sit your child on your knee and have him/her “ride a horse” while you bounce your knee up and down
- Sit your child on an exercise ball and gently bounce up and down
- Swinging in a blanket or sheet (have the child lay in a blanket and have two adults each hold an end and lift to swing back and forth)
- Climbing stairs
- Jumping on the floor, couch cushions, or a trampoline
- Sliding down a slide
- Playing on a sit-n-spin
- Take a ride in a laundry basket
- Riding on a push car, scooter board, scooter, tricycle, balance bike, or bike with pedals
- Dance and move your body to music
- Do some yoga poses (downward dog, windmill pose, etc.) or animal walks (bunny hops, walk like a bear, etc.)
- Wheel-barrow walks
- Playing row-row-row your boat or tug-o-war, emphasizing the back-and-and-forth motions
- Swinging (inside or outside)
- Swimming
- Try balancing while walking across stepping stones in the yard
- Trying sitting, kneeling, or standing on a balance cushion or pillow
- Walking along a designated line by using blue painters tape on the floor, make the line straight or go zig-zag across the room

