



Complex Child E-Magazine

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Trunk Support Options for Children with Low Trunk Tone by Susan Agrawal

Children with a wide variety of conditions present with low muscle tone (hypotonia) in their trunks, making it difficult for them to sit up properly, stand, and walk. Some children have virtually no tone at all, and are completely unable to hold their heads up or sit up, while others are more mildly affected, with only minor deficits in sitting or walking.

Regardless of the level of hypotonia, most children can benefit from wearing a trunk support garment or device. These items not only help with functional activities like sitting and walking, but they also help to prevent spinal deformities, including scoliosis and kyphosis (curvature forward of the upper back).

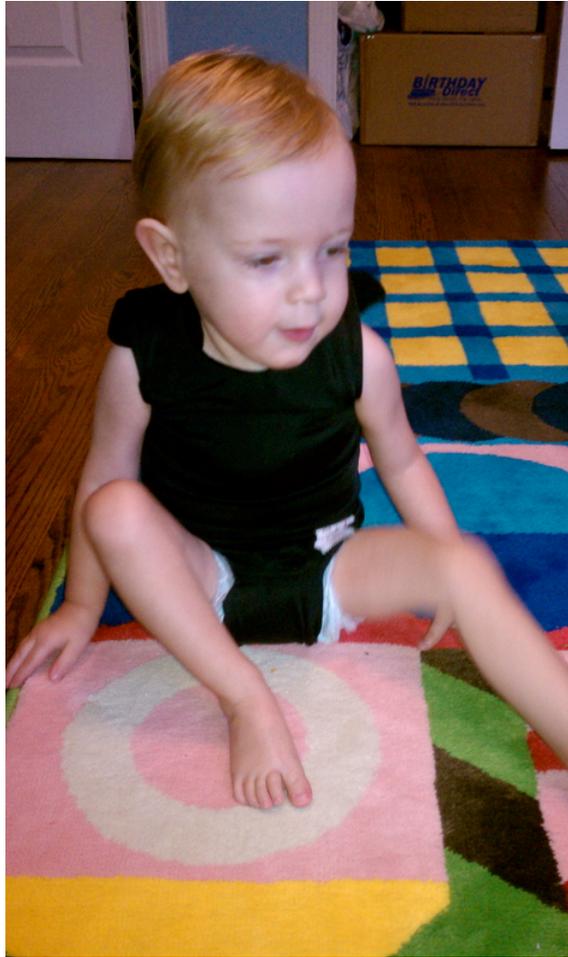
Products range from simple compression garments to complicated hard plastic scoliosis braces. The choice of brace may depend on your child's needs, functional goals, and preexisting spinal deformities. Listed below are some of the most common devices, roughly in order from the least supportive to the most supportive.

SPIO Vest

<http://www.spioworks.org/>

SPIO, which stands for Stabilizing Pressure Input Orthosis, is a compression garment useful for providing sensory input to help children with a variety of conditions to improve their trunk tone, function, and posture. The most popular item, the SPIO Vest, is made of thin Lycra with a Neoprene back, and can be worn under the clothes, even on warm days due to its breathable fabric. It Velcros over the shoulders and through the crotch for a custom fit.

Unlike other products, the principle of SPIO is compression, deep pressure and sensory input. It does not provide physical or rigid support, though the vest can be used in conjunction with a rigid brace. As such, this vest may not be helpful to children with extremely low tone or spinal deformities.



Garrett in his SPIO vest

SPIO may be covered under your insurance, though this varies by plan. The vest currently retails for \$145. SPIO also makes compression shirts, pants, and gloves. Custom items and sizing are available for an additional fee.

TheraTogs

<http://www.theratogs.com/>

TheraTogs are unique garments that combine a basic support vest and shorts with customizable strapping to address individual posture and mobility needs. They are considered to be “wearable therapy,” with the strapping system substituting for a therapist’s hands.

There are several suits available, all of which are made of a foam interior with a Velcro sensitive exterior. Children wear them under the clothes. They typically include a two-piece top and hipster, both attached with removable Velcro tabs. A variety of Velcro pieces and stretchy straps are then added to provide gentle forces to the body to correct or improve posture and alignment.

The primary criticism of the TheraTog system is that it is difficult to get on and cumbersome to place all the straps and Velcro pieces. It typically requires a therapist to individualize the strapping system. It is unsuitable for children with fluctuating tone or movements that may cause the strapping or vest to fall off. While it provides gentle support and can be customized to provide additional support, it does not provide enough physical support for children with very low tone or extensive spinal deformities.



Lydia using TheraTogs

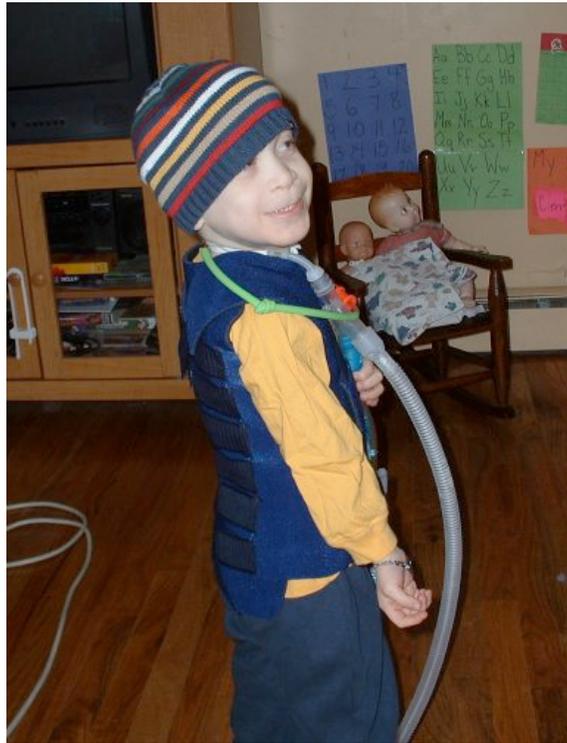
Systems include the new Posture and Torso Alignment kit, a “starter system” that is easier to use, as well as the standard Full Body kit. These range in cost from \$350 for the infant-size starter kit to as much as \$800 for the Full Body kit. Many insurers are now covering TheraTogs. Other available products include kits for the legs, shoulder, wrist, and kits for sensory input.

Benik Vest

<http://www.benik.com/peds/trunk/>

Benik manufactures neoprene orthoses, including two trunk support vests. The V-100 is a two-piece garment with Velcro at the shoulders and crotch. The V-200 has a zipper front, crotch strap, and Velcro at the shoulders and along the sides for a custom fit. The latter is preferable for children with feeding tubes, lines, and ostomies for quick access

and also allows easier donning. Both vests are available in set stock sizes as well as custom sizes.



Connor wearing a Benik Vest V-200

While Benik vests also provide pressure and sensory input, the neoprene fabric provides some physical support to the wearer. The Vest is typically worn over clothing. Benik vests can even be used in the water. While most children see at least some improvement with the Benik vest, it will not provide extensive support for children with very low tone or spinal deformities.

Benik vests are often covered by insurance, as the cost is quite high. Benik also makes wrist, elbow, shoulder, and knee supports, as well as shorts and wraps. All items are available in a variety of colors.



Two more pictures of Connor in his Benik Vest

Dynamic Movement Orthoses

http://www.bostonbrace.com/Content/Dynamic_Movement_Orthoses_Lycra_Suits.asp (US distributor)

<http://dmorthotics.co.uk/products/dynamic-lycra-orthotics.php> (Manufacturer)

Boston Brace has been manufacturing TLSOs for years, but recently expanded to include a new category of Lycra compression products, called Dynamic Movement Orthoses, manufactured by DM Orthotics Ltd. in the UK. These are specifically designed for children with abnormal muscle tone due to neurological issues. The Lycra provides gentle compression, while built-up fabric in specific areas supports muscle systems and corrects developing deformities of the spine. It is designed to target scoliosis and kyphosis, as well as low tone and spasticity.

Each suit is custom designed and fit by an orthotist, and should be covered by most insurance plans. Other products include gloves, shorts, and leggings. Dynamic Movement Orthoses also makes stock sized spinal wraps out of neoprene, available at <http://dmorthotics.co.uk/uploads/DMO-spinal-stability-wrap.pdf>.

Second Skin Custom Garments

<http://www.secondskin.com.au/>

Based in Australia, Second Skin makes custom compression garments for children, including a Body splint, Mobility splint, and Postural splint. Each splint is custom designed to meet the needs of the individual child. They are made of a soft but supportive fabric that conforms to the skin and promotes supported dynamic movement. Splints correct alignment and posture while adding support and sensory input. The level of support is dependent on the type of splint, with Postural splints able to assist with children who are severely low tone or with extensive spinal deformities.

Currently, clinics are held in Australia, the UK and Ireland for Second Skin Garments. Other items include foot, arm, wrist, and lower extremity splints.

CharleyWrap

<http://www.charleywrap.com/>



Charley in her CharleyWrap

The CharleyWrap was designed and sewn by a mother for her child to provide physical support and correct spinal deformities. It worked so well that the mother now custom makes wraps for other children. The CharleyWrap is a simple below-the-armpit wrap

made of soft material that can be worn under clothing. Sewed into the wrap are a series of “bones,” much like an old-fashioned corset, which provide stability, support, and alignment. It dramatically improved the spinal curvature of the designer’s daughter through the physical support and alignment it provides.

Each wrap is custom-made in New Zealand. Families in New Zealand are advised to arrange a personal consultation. Families from other countries may submit photos, video, and measurements.

SpineCor Brace

<http://www.spinecorporation.com/English/index.htm>

While designed for children and adults with idiopathic scoliosis, some providers have used the SpineCor brace, a soft brace used to correct scoliosis, for children and adults with scoliosis secondary to neuromuscular conditions. It is a dynamic splint, allowing movement, while providing support and correction.

Currently, the manufacturers consider the SpineCor brace “experimental” for children and adults with neuromuscular conditions. There is limited information on its value and use in this population.

TLSO

TLSO stands for Thoracic LumboSacral Orthosis, and is typically a rigid plastic or semi-rigid brace that covers the entire torso. There are many different styles, often named after the place they were invented. For example, the Boston Brace TLSO is an underarm brace that covers the torso and is typically made of hard plastic to provide maximum support and correction of scoliosis. Similarly, the Milwaukee Brace TLSO adds a cervical or neck support to the brace, while a Charleston Brace positions a child to the side and is only worn while sleeping.

In general, children with neurological issues receive a custom brace that meets their specific needs, using casting and measurements done by an orthotist. Some children wear their TLSOs 23 hours per day in an attempt to correct spinal deformities. Others only wear their TLSOs for functional activities, such as sitting, standing, or walking. TLSOs are also commonly used after corrective spinal surgery.

While most TLSOs are made of hard plastic, some newer styles use softer or flexible materials, which may be better tolerated by some children.

It is difficult for many children to tolerate wearing a TLSO. Many orthopedists currently recommend TLSOs only for children with functional or positioning needs (such as assistance in sitting or standing) and not full time for correction of spinal deformities, as there is little evidence that bracing changes the natural course of scoliosis in a child with

severe neurological issues. The often small benefits of correction must be carefully weighed against the issues that may occur in wearing a brace 23 hours per day, which may include skin breakdown, difficulty sleeping, and other issues.



Karuna in her TLSO

Nonetheless, TLSOs provide the maximum level of support for children with hypotonic trunks, allowing them to sit up straighter and improve posture. A TLSO may lead to improved feeding, bowel habits, easier transfers, reductions in scoliosis and kyphosis, and improved muscle strength.