

## SUIT THERAPY

**Disclaimer: Because of the complexity of the therapy suit and the potential complications it could cause, Euro-Pēds believes that only trained professionals should provide Suit Therapy. Therefore, Euro-Pēds does not sell their therapy suit or promote its use in the home.**

Euro-Pēds<sup>®</sup> does not utilize the TheraSuit<sup>®</sup> or Adeli<sup>®</sup> Suit in any manner; Euro-Pēds<sup>®</sup> exclusively uses the Euro-Pēds<sup>®</sup> Suit in the treatment of our patients.

### The History of the Suit

A body suit was originally developed to help cosmonauts suffering the effects of being in a gravity-free environment for an extended period of time. At times, cosmonauts were actually carried from the space shuttle after landing because they were unable to walk after extended periods of weightlessness. Without the compression of gravity, the cosmonauts' spinal cords elongated about 2 inches. This, no doubt, caused neurological changes in their bodies. In addition, they did not have to use their muscles to fight against gravity in order to move around which caused risk for muscle atrophy and bone demineralization which can cause osteoporosis. The cosmonauts would also lose range of motion (ROM) and function in their muscles. Because of these significant effects, A Russian scientist designed the suit so that the cosmonauts would not suffer from the effects of the loss of gravity while they were in space. Children with cerebral palsy or other developmental disorders do not have the same cause of difficulty of movement that the cosmonauts did, but they suffer a lot of the same effects: decreased ROM, muscle weakness, and difficulty moving against gravity.



An effort was made to develop a suit for children with developmental disorders that was based upon the cosmonaut's suit. An early prototype was developed in 1992. It consisted of an outfit worn with a series of bungee-type rubber cords that cause deep compression to the body's joints and resistance to muscles when movement occurs. What they soon discovered is that this suit worked well for children with CP, but it was mainly designed for movements in an upright position such as standing or walking. This is due to the way the bungee cords could be placed on the child; therefore, they only received the resistance they needed when they were upright. In 1994, a new suit was designed to address the body in other positions that the child may be in. This suit consisted of a vest, shorts, headpiece, knee pieces, and special shoes with hooks to attach cords to. This suit also used bungee cords, which were designed to produce tension similar to the tension produced by elongation and shortening in human muscles. The suit was designed in a way that the placement of the bungee cords can assist weak muscles or strengthen weak muscles. The bungee cord placement can also correct abnormal body positions or movement patterns from non-structural sources (such as tight muscles rotating the legs so that the feet are turned in or out as they walk or the legs being adducted or crossing). All in all, this enables you to bring the child's body into a position as close to normal as possible in both static and dynamic positions (align them when they are not moving and also when crawling, walking, etc.) For example, many kids have a lordosis or curving of the lower spine. This is correlated to overstretched and weak hamstrings, gluteals, and lower abdominal musculature, as well as tight hip flexors. By placing bungee cords to promote hip extension and lower abdominal contraction, you can help to correct this.



Additional features were added to the suit used at Euro-Pēds, which is currently patent-pending. This suit has built-in padding around the neck and shoulder region for comfort. It also has access between the legs, which is convenient for changing diapers and toileting without having to remove the suit. Velcro strapping at the sides of hips and chest make it possible for a firm fit for any size child and can address minor hip subluxation. The Velcro strapping also decreases the amount of time

needed to put on the suit. Soft, comfortable material loops are sewn over the suit to attach the resistive bands to. These bands are easy to apply and adjust and are cut to a specific length for each child allowing maximum adjustability. They are also wide, which makes them more comfortable against the child's body.

### **Positive Effects of Suit therapy**

The vestibular system is a very important system that affects our ability to move. Our body is full of sensory organs that report information to the brain about what our body is experiencing, where our body is in space, and if our body is actually doing what our brain is telling it to do. Major players of this communication channel are the proprioceptive and sensory organs in all of our joints. Wearing the suit causes compression of all major joints.

This deep pressure awakens all the sensory and proprioceptive organs in that joint. This is of incredible value. In fact, this is how babies and us, even to this day, learn, grow and develop. The sensory organs send information to our brain about what our body is doing; our brain receives that information and sends out a signal of how it wants our body to respond. The brain is the center of that circle which makes continuing corrections judging if our body is actually doing what the brain sent out as a command.

Cerebral palsy is a result of some sort of brain injury. This causes interference within the circle of information. While it may be obvious that with a brain injury the information coming out from the brain may be abnormal, it is crucial to realize that this also causes the information coming in from the sensory organs to be abnormal. This starts a vicious cycle of abnormal messages being sent in and abnormal messages being sent out which just exacerbates as the child grows older when no intervention is applied.

Suit therapy provides a way to break this cycle by helping the sensory and proprioceptive organs to send normal information to the brain. By applying the resistive bands and bringing the alignment and movements of the body as close to normal as possible, real changes can be made in the rewiring and normalizing of information in the brain. You



cannot undue the damage done to the child's injured part of the brain, but the brain is capable of making new connections and becoming more efficient.

EEG studies have been done on the brains of children who have been participating in Suit therapy treatment. They found abnormal EEG signals at the start of the therapy and



actually found normalizing EEG signals as the therapy progressed. The research has also made claims that these EEG improvements can help to normalize muscle tone.

In addition, the placement of the resistive bands causes resistive forces to be applied to specific muscle groups as the child moves. This strengthens muscles in their proper alignment throughout the therapy session. Overall, the suit can be described as an accelerator to progress made during therapy.

### **Contraindications to Suit therapy**

In order to utilize the suit safely, children are screened by our Medical Director prior to Suit therapy. Children with certain medical conditions may not be candidates for Suit therapy or may need adaptations and/or careful monitoring. We require recent hip x-rays (with in 6 months), spine x-rays if there is scoliosis, and occasionally a bone scan prior to using the suit. Because Euro-Pēds is located in a fully equipped hospital, if unexpected complications arise, we do have the facilities to manage the situation immediately. The following is a list of the absolute and relative contraindications to Suit therapy.

#### ***Absolute Contraindications (Child is not eligible for Suit therapy):***

- Subluxation or dislocation of hips exceeding 33%
- Scoliosis exceeding 25°
- Pathological fractures or other bone disease (osteoporosis)
- High Blood pressure
- Certain Types of Heart Disease
- Complicated systemic disorders (specifically of the circulatory system)

***Relative Contraindications:***

Children with one or more of the following conditions may still be eligible to participate in Suit therapy with adjustments and/or close monitoring. These children will need to meet with our medical director and be evaluated on an individual basis.

- Hip subluxation of 20% to 33%
- Poorly controlled epilepsy
- Severe spasticity accompanied by structural joint contractures
- Disease of the spine and/or joints
- Severe intellectual disabilities affecting all types of communication
- Height of less than 34 inches (85 cm)
- Baclofen Pump therapy
- Tracheal tube
- Gastrointestinal tube
- Hydrocephalus (shunt)
- Progressive encephalopathies
- Liver or kidney disease
- Myopathies

If you have any further questions regarding the suit or are interested in obtaining more information regarding Suit therapy, please feel free to contact us toll-free at 1-888-875-6662 or at [europeds@dhofm.com](mailto:europeds@dhofm.com).

