Scientific Evidence For The Basis Of The Euro-Pēds Program

Euro-Pēds therapy is based on a variety of established treatment methods and techniques. The intensity of our program allows the application of the principles of motor learning and motor control to provide enough repetition to allow the child to learn a new motor skill[1]. We employ stretching techniques that have been shown in the literature to be effective in increasing range of motion and providing lasting results[2-7]. Strength training is a main focus of our program. There is increasing evidence in the literature that weakness is a major detriment to children with cerebral palsy (CP) and hinders the achievement of the child's gross motor skills [9-11]. Research indicates that even children with mild CP have substantial weakness when compared to age related peers[12]. Research has also shown that strength training is effective in children with CP and will improve functional motor skills and walking [8-11]. According to the American College of Sports Medicine, research has demonstrated that resistance training for children, when properly performed, can be productive and beneficial, outweighing the risks[13].

Although, there has been little scientific research on intensive therapy in the past, there are a few studies that suggest that a regime of intensive therapy, which provides practice conditions for consolidating motor skills, may be best for optimizing motor training. In a pilot study by Trahan & Malouin, 5 children with CP received intensive therapy periods (4 times/week for 4 weeks) combined with periods without therapy (8 weeks) over a 6-month period. The Gross Motor Function Measure was used by a blind evaluator to look at changes in motor performance. The GMFM is a standardized tool that was developed especially to look at the gross motor skills of children with CP. The higher the GMFM score, the more motor skills a child can perform. Results indicated statistically significant increases in GMFM scores in three children, and all participants maintained their motor performance during the two 8-week rest periods. [29]

Another study was done by Tsorlakis, et al in 2004. This study examined the effect of neurodevelopmental treatment (NDT) and the differences in its intensity on gross motor function of children with CP. 34 children with mild to moderate spasticity and hemiplegia, diplegia, or tetraplegia were randomly assigned to two groups: group A underwent NDT twice a week and group B five times a week, each for 16 weeks. Using the GMFM before and after intervention, the study found that there was a significant improvement of both groups after intervention. The study also found that the children in group B performed better and showed significantly greater improvement than those in group A. Overall, the results of the study support the effectiveness of NDT and underline the need for intensive application of the treatment.[33]

Three studies were performed in series by Bower and McLellan, which revealed a trend towards greater success with intensive therapy.[30-32] Their 2001 study was a randomized control trial where children with CP received therapy 5 days per week for 6 months in a row

followed by a 6-month rest period. This study was unable to meet statistical significance which may have been due to the long duration of both therapy and rest time.[19]

Regarding SUIT Therapy itself, there has been little research performed thus far in the United States. There are two published research studies in American journals. In one study by Semenova, he claims positive clinical effects in 70% of patients including improvements in walking and self-care. These effects were demonstrated by electroencephalography (EEG), electroneuromyography (EMG), studies of somatosensory evoked potentials, and studies of the vestibular system. This research article was unclear about the parameters of the study, but does describe 30-40 minute sessions of suit therapy consisting of mainly walking activities.[15] A study by Shvarkov et al, describes a set up of 15 consecutive days of suit therapy sessions that were 20-120 minutes in length. The suit therapy was combined with conventional therapy for 45 adults with acute cerebral vascular lesions and 10 with hyperkinetic disorders. They found 71.9% of the subjects obtained stable clinical effects, as well as statistically significant decreases in pyramidal syndrome, increases in well being/activity/mood test and improvements in EEG signals.[14]

Koscheyev and Leon have completed an unpublished pilot study at the University of Minnesota. This study consisted of 6 adults with CP or stroke who underwent 3 weeks of intense therapy using suit therapy. Therapy was 5 days per week for 2 hours per day. The subjects, caregivers and therapists completed a questionnaire revealing clinical improvements in motor skills, emotion, stamina and speech. Motion analysis revealed less variability in walking, improved movement of paralyzed arm, and improved upright posture during gait activities in corresponding patients. At a 4-week follow-up, all results were maintained.

Several research articles have been printed in Russia, which study the effect of suit therapy on children with CP. They are reporting positive results including improvements in balance and control in standing,[15] improvements in motor function,[16] less reliance on visual analysis in standing due to increased reliance on proprioceptive input,[17, 18, 19] improved vertical stability,[17, 20, 21] and normalization of EEG signals [22]. These results were measured objectively using tests of the vestibular and balance systems, EEG's and computerized stabilography.

In addition to research being done specifically on suit therapy, several research articles have been published on compression garments – an aspect of suit therapy. The use of compression garments has resulted in improvements in the Pediatric Evaluation of Disability Inventory (PEDI), [23, 28] improvements in PROM, [24, 25] improved posture [25, 26] reduced involuntary movement, [26] reduction in spasticity, [27] improved proximal and distal stability, [27] and improved somatosensory evoked potentials.[27]

Euro-Pēds has completed their first research study, which was a pilot study on the use of Suit Therapy combined with intensive physical therapy in children with CP. Each of the 9 subjects who met the criteria, were evaluated using the GMFM before and after a two-week

program of Suit Therapy combined with intensive therapy. Therapy was provided Monday through Friday, 4 hours/day with approximately 1-2 hours of that time spent wearing the Suit.

The findings showed increases in individual patient GMFM scores with a mean of 7.26% and a range of 3 to 13 %. There were also increases within each GMFM dimension scale and overall with a mean of 16.56% and range of 11% to 36%. The largest improvements occurred in lying and rolling activities. These findings suggest that the combination of Suit Therapy with a short course of intensive physical therapy may sufficiently reduce the functional limitations of children with CP allowing for a lesser degree of dependence.

When these results were compared to the pilot study on intensive therapy previously noted by Trahan & Malouin, some interesting comparisons were found. The percent of increase in the GMFM scores were similar in both studies. This suggests that 10 sessions or 2 weeks of Euro-Pēds intense therapy program including Suit Therapy may be as effective as 30 sessions over 6 months of a less intense therapy program that did not use the Suit. Of course it is understood that there are numerous limitations to pilot studies, but these preliminary results show some promising outcomes. Euro-Pēds is currently in the process of looking for funding for a broader study that is planned to begin very soon. This study will include a larger sample size and a more detailed design. Euro-Pēds will continue to evaluate the effects of the elements of a program of intensive physical therapy combined with Suit Therapy both in the short term and long term.

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