



# An Algorithm for Optimizing the Effectiveness of the TherAlign™ Dragonfly TLSO System for Children

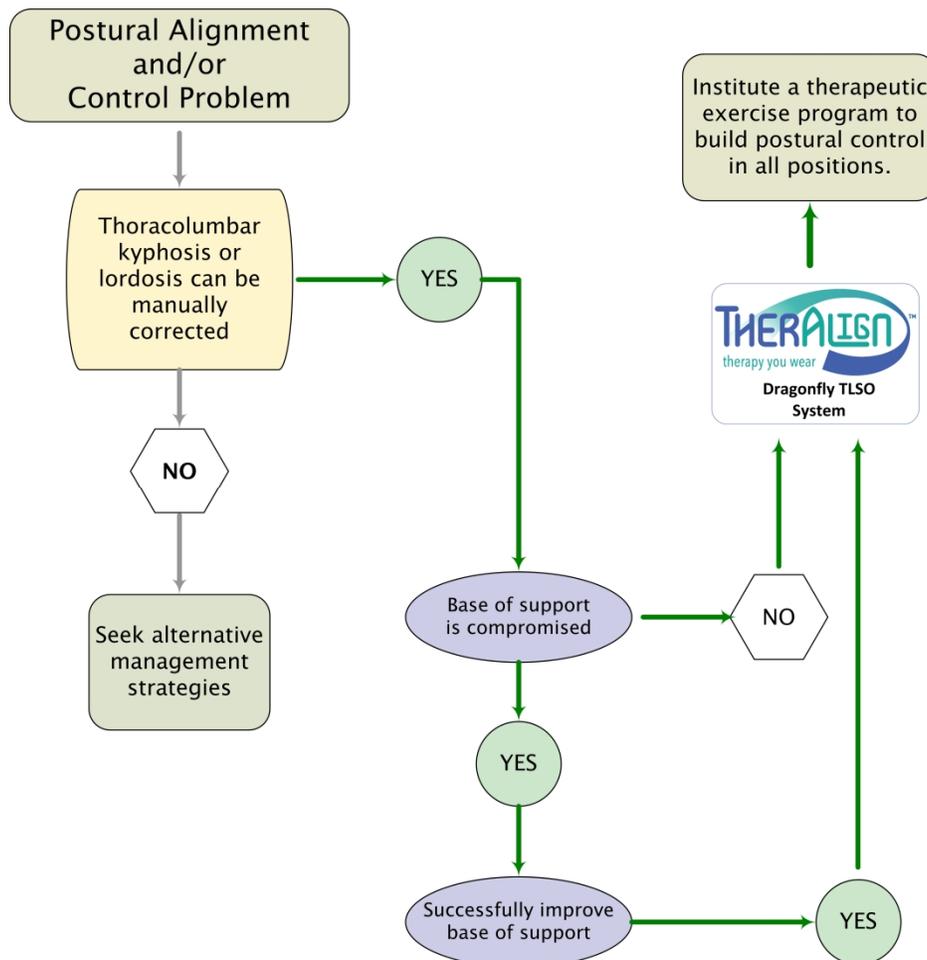
**From Beverly Cusick, PT, MS, NDT, COF, Chief Medical Officer:**

The acquisition of postural control – the foundation for functional use of the arms and legs - is paramount as it serves the innate – and life-preserving - drive to gain and maintain upright postures. In the first 4 months of life, typically developing infants gain symmetrical antigravity neck and trunk extension strength and control, soon followed by antigravity flexion strength and control. These basic components of postural control operate as building blocks for gaining limb use and movement skills within and between postures.



Children with muscle length imbalances related to hypotonia, ligament laxity, and various manifestations of cerebral palsy and low-level myelodysplasia have been shown by several researchers to lack normal muscle strength in all muscles tested. They typically sit with the head and shoulders forward and the spine rounded, compromising respiration, visual attention, and stability. Many of them use the extremities to stabilize rather than to play and move. We at TheraTogs, Inc. are thrilled to contribute the **TherAlign™ Dragonfly TLSO** – our new, customized, light-weight, spinal alignment orthosis - to the effort to build essential spinal alignment and control.

## TherAlign DragonFly System – Intervention Algorithm



You'll find that in the algorithm, as you travel down from the top box to "Corrects with unforced manual assistance", you are led to assess and, if needed, address the functioning base of support before introducing the TheraTogs PTA. As Dr. Shirley Sahrmann suggests, I begin by optimizing the body-ground interface in prone, sitting, and standing positions.

For example, sitting independently with a vertical sacrum and lumbar spine might not be possible without adapting the base of support by a) assuring that the feet contact the floor securely; b) raising and/or tilting the seat surface forward; c) increasing the seat surface resistance to sliding, and so forth.

When the child is working in the standing position, I address pronated or supinated feet with orthotic devices or preliminary serial casts designed to improve weight-loading on the whole foot and to facilitate weight shifts onto the heels as much as possible.

In 2011, Pfeifer and others presented the results of their second study of the effects of wearing 2 types of Spinomed® back orthosis – devices that resemble the DragonFly TLSO in design.<sup>1</sup> The back orthosis was prescribed for problems related to osteoporosis in 62 women over 60 years of age with kyphotic curves  $\geq 60^\circ$ . Wearing the orthosis for a minimum of 2 hours/day during a 6-month period showed these results vs. no change in the control group:

- 72% increase in back extensor muscle strength ( $P < 0.01$ ), measured isometrically while the subjects were sitting on a DigiMax MechaTronic system.
- 44% increase in abdominal flexor muscle strength ( $P < 0.01$ )
- 11% decrease in the angle of kyphosis ( $P < 0.01$ )
- 23% decrease in body sway ( $P = 0.03$ )
- 19% increase in vital (lung) capacity ( $P < 0.01$ ).

This data supports the view that a consistent program of living in improved functioning postural alignment can foster strength gains in the muscles that operate the affected body segments without adding a strengthening exercise regime.

Following the introductory period, trunk muscle strength and postural control (as indicated via body sway measures) should improve over several months of consistent wear.

I look forward to learning more from researchers who are adequately equipped to challenge this hypothesis.

**Got Feedback?** We'd appreciate any suggestions you have for improving the usefulness of the TherAlign DragonFly System Algorithm, and any more tips and observations that you might like to share.

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<sup>1</sup> Pfeifer M, Kohlwey L, Begerow B, Minne HW. 2011. [Effects of two newly developed spinal orthoses on trunk muscle strength, posture, and quality-of-life in women with postmenopausal osteoporosis: a randomized trial.](#) *Am J Phys Med Rehabil.* 90(10):805-15.

Pfeifer M, Begerow B, Minne HW. [Effects of a new spinal orthosis on posture, trunk strength, and quality of life in women with postmenopausal osteoporosis: a randomized trial.](#) *Am J Phys Med Rehabil.* 2004 Mar;83(3):177-86.