The Effect of TheraTogs™ on Gait in a 5-Year Old with Spastic Hemiplegia

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Introduction

TheraTogs™ is a new modality that seeks to be a standard of care worldwide for the management of movement, stability, orthopedic, and developmental disorders through neuromuscular re-education. The manufacturers claim that the user gains the experience and the training potential of prolonged therapeutic "handling" throughout the day. TheraTogs™ is an orthopedic undergarment and strapping system that consists of a sleeveless tank-top and two hipsters each with two thigh cuffs made from nylon and spandex with a foam layer made of aqueous-based elastomeric urethane, and a variety of elasticized straps, and instructions. Indications for the use of TheraTogs™ include scissoring or in-toeing gait, brain injury, muscle imbalances, postural malalignment, and muscle recruitment problems. Despite the manufacturers claims, there is a lack of research supporting effects of TheraTogs ™.

Purpose

The purpose of this study was to determine the effect of TheraTogs™ on gait in a 5-year-old child with spastic hemiplegia. Our hypothesis was that gait dynamics would improve with the wearing of TheraTogs™ over a 4-week period and there would also be a carryover effect once the TheraTogs™ had been removed for 2 weeks.

Methods

Subject

The single subject in this study was a 5-year-old boy with spastic hemiplegia and an extensive medical history. His history included: CHF, heart transplant, cerebral ischemic event, and post-transplant lymphoproliferative disease. The subject ambulated with a gait trainer walker and bilateral dynamic AFOs.

Procedures

The data collection period consisted of 5 test sessions; each test session consisted of 3 trials of ambulating on the GAITRite® electronic walkway. An initial baseline was established on the first test session, after which the TheraTogs™ were introduced. A strapping technique to facilitate hip abduction was utilized. The subject wore the TheraTogs™ for 4 weeks; test sessions were performed after the initial application and both 2 and 4 weeks post application of TheraTogs™. TheraTogs™ were then removed for 2 weeks and a final test session was performed. The caregiver was educated on proper application technique of applying TheraTogs™ and was asked to have the subject wear them every day for a minimum of 6 hours and ambulate a minimum of 30 feet. Throughout the study the subject's caregiver filled out a Parent TheraTog Log documenting wear time and estimated ambulation distance per day.

Outcome Measures

The parameters of gait that were assessed were step time, stride length, cadence, velocity, heel-to-midline base of support, and toe in/out.

Data Analysis

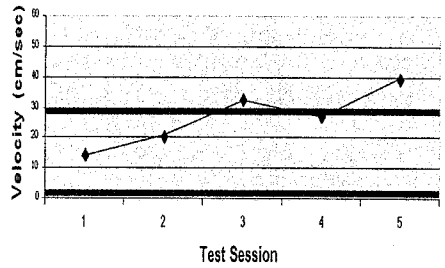
The data in this study was examined using a two-standard-deviation band analysis for each gait parameter. The results were considered significant if they were 2 standard deviations above or below the baseline mean.

Results

Significant increases were found in heel-to-midline base of support, velocity, and cadence when comparing the baseline measures to measures post-intervention. A significant decrease was found in left toe in/out. No significant difference was found for stride length, step time, or right toe in/out. The carryover effect was significant for velocity, cadence, and heel-to-midline base of support.

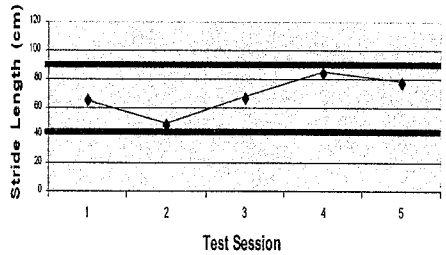
For the graphs: Test 1 is baseline without TheraTogs™; Test 2 is TheraTogs™ applied immediately after Test 1; Test 3 is at 2 weeks with TheraTogs™; Test 4 is at 4 weeks with TheraTogs™; Test 5 is 2 weeks after Test 4, without TheraTogs™.

Velocity



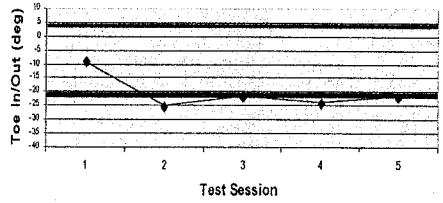
Test 3 and 5 showed significant improvements, Test 4 approached significance for Velocity

Stride Length



No significant difference in Stride Length

Left Toe In/Out



Test 2 and 4 showed significant declines, Test 3 and 5 approached significance for Left Toe In/Out

Discussion

The results of this study were inconclusive but generally supported the researchers' hypothesis showing improvement for some of the gait dynamics with the use of TheraTogs™. Gait velocity, cadence, and base of support were improved, left toe in/out declined, and stride length and step time were not improved. There are several outside factors that may have contributed to the results that we found in this study. The subject presented with a wind-swept gait pattern that explains the difference seen between left toe in and right toe out variables. Throughout the test sessions, left toe in unexpectedly increased which may have been a result of the strapping application. The strapping application technique used was designed to control a scissoring gait by increasing abduction. We believe that another strap to control external rotation may have prevented the increase in left toe in. We were also unsure if the carryover period was effective for velocity. Although velocity increased, stride length decreased with a possible compensation in cadence. Heel-to-midline base of support results may be inconclusive because there was a dramatic increase after immediate application that was not seen in test 3 and 4. A longer duration with multiple baseline measures would have been beneficial.

Conclusion

This study showed improvements in gait velocity, cadence, and heel-to-midline base of support for this subject after wearing TheraTogs ™. Left toe in/out declined and there were no improvements shown in step time, stride length or right toe in/out. This was a single subject case design and generalizability of the results should be considered with caution. Due to a lack of research of TheraTogs, this study adds to the body of literature by establishing a framework for further research.

Acknowledgements

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References

Available upon request