THE EFFECT OF THERATOGS ON THE GAIT OF A CHILD WITH CEREBRAL PALSY: A CASE STUDY.

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PURPOSE

The purpose of this case study was to investigate the effectiveness of Theratogs (Available at www.Theratogs.com) as a physical therapy intervention for a child with spastic diplegia and whether or not the Theratogs wearing pattern altered the child’s gait in a beneficial manner. Furthermore, we studied the results to observe other children suffering from insufficient gait associated with CP.

SUBJECT

A five-year old boy (CM) with a diagnosis of spastic diplegic cerebral palsy who ambulates with bilateral rigid AFO's. He is currently in physical therapy to maximize function and muscle activity between flexors and extensors of the hip and knee. The child’s pelvis, trunk, and shoulders end of swing. The knee presented with less flexion at separation of metatarsal heads in the frontal plane indicating less overall excursion and a more efficient, less energy consuming gait pattern.

RESULTS

Comparison of Theratogs and non-Theratogs on gait patterns:

- Normal gait: At IC approx. 30 degrees flexion, decr. flexion into beginning of preswing where it continues to decr. into swing (TS).
- Normal gait: Knee begins in neutral at IC, slight flexion occurs during stance, and at the end of swing.
- Normal gait: Neutral immediately into slight plantarflexion (PF), incr. dorsiflexion (DF) throughout stance, followed by PF at pre-swing, and, incr. DF to neutral at the end of swing comprises the cycle.

- W/ Theratogs: More PF at IC, incr. DF during stance, and at the end of swing.
- W/ Theratogs: Knee flexion closer to normal while wearing Theratogs (Blue/W, Red/W/O).

- W/O Theratogs: More displacement before IC and ASIS was less level during and at end of swing.
- W/O Theratogs: Less displacement before IC and ASIS closer to level after Theratogs.

- Pelvis:
  - Normal gait: Very little pelvic excursion. Graph is almost a straight line.
  - W/O Theratogs: More overall pelvic excursion.
  - W/ Theratogs: More overall excursion.

- Shoulder:
  - Normal gait: Minimal excursion. Graph is nearly straight.
  - W/O Theratogs: More overall excursion.
  - W/ Theratogs: Less excursion overall.

- Hip:
  - Normal gait: Knee flexion at IC and during swing.
  - W/ Theratogs: Knee flexion closer to normal while wearing Theratogs (Blue/W, Red/W/O).

- W/O Theratogs: Knee flexion at IC and during swing.

DISCUSSION

In general we found the application of Theratogs improved the quality and efficiency of CM’s gait. At each joint some improvement was noted superiorly and posteriorly while muscle activity between flexors and extensors of the hip and knee. Furthermore, at the ankle, there was increased plantar flexion at IC and dorsiflexion during stance and the end of swing. The knee presented with less flexion at IC and during swing. The graph portraying CM’s big knee motion during stance indicating more coordinated muscle activity between the flexor and extensor muscle groups. Theratogs helped to reduce the co-contraction of these muscle groups and may have allowed CM to reduce the co-contraction of these muscle groups.

CONCLUSION

Our findings demonstrated an improved gait from a biomechanical perspective with the use of Theratogs. CM showed greater separation of anatomical landmarks in the frontal plane indicating less of a scissoring motion. Furthermore, at the ankle, there was increased plantar flexion at IC and dorsiflexion during stance and the end of swing. The knee presented with less flexion at IC and during swing. Data of CM’s big knee motion during stance indicated more coordinated muscle activity between the flexor and extensor muscle groups. Lastly, CM’s pelvic, trunk, and shoulder all stayed closer to level indicating less overall excursion and a more efficient, less energy consuming gait pattern.