

# COMPARING MOVEMENT DEVELOPMENT IN CHILDREN WITH CP ENROLLED IN TRANSDISCIPLINARY CONDUCTIVE EDUCATION TO CHILDREN WITH CP RECEIVING TRADITIONAL THERAPY IN THE USA

Roberta OShea, PT, PhD

[roshea@govst.edu](mailto:roshea@govst.edu)

Peter Pidcoe, PT, DPT, PhD

# Background

- Conductive Education (CE) has proven effective in increasing participation and self actualization for children with CP (Schenkner,2006).
- To date however, investigations on the impact of CE on motor skill development have yet to reveal any difference between CE and other intensive therapy programs.
- This research demonstrates improvement in children's functional skills, specifically hand to mouth activity, sit to stand activity, and ambulation while they were enrolled in a CE program.

# Design

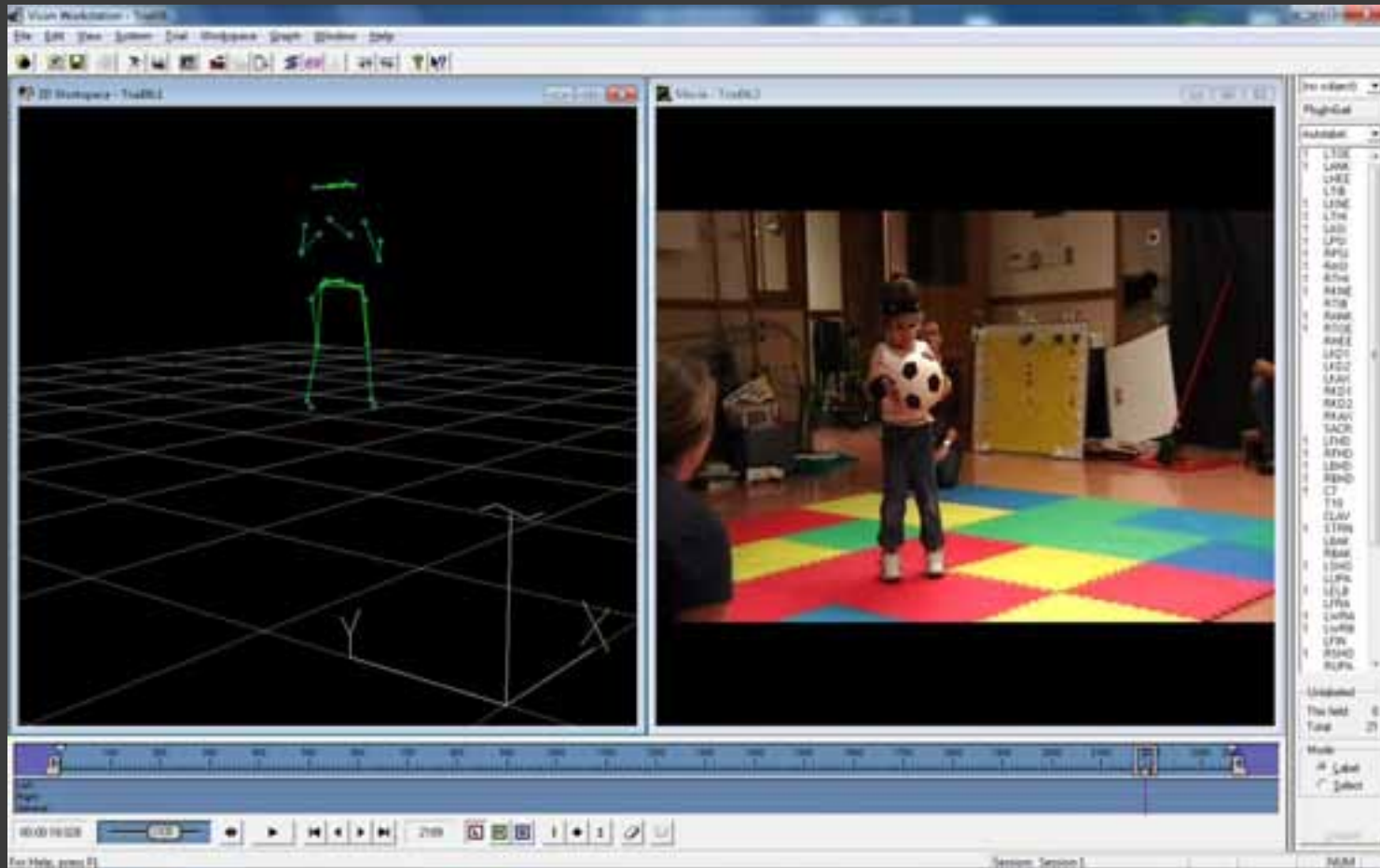
- Using a case series design, 10 children with CP GMFCS levels III, IV, and V enrolled in Transdisciplinary CE (TCE) participated in once a month data capture over the course of a year.

3 children with CP GMFCS levels I and III, acted as a control group. These children were not enrolled in TCE but received standard therapy school services. They participated in data capture 2 times over a 9 month period for comparison

- Objective data were collected via motion capture during the performance of functional activities and compared to like movements in typically developing children and children with CP but no CE intervention.

# Methods

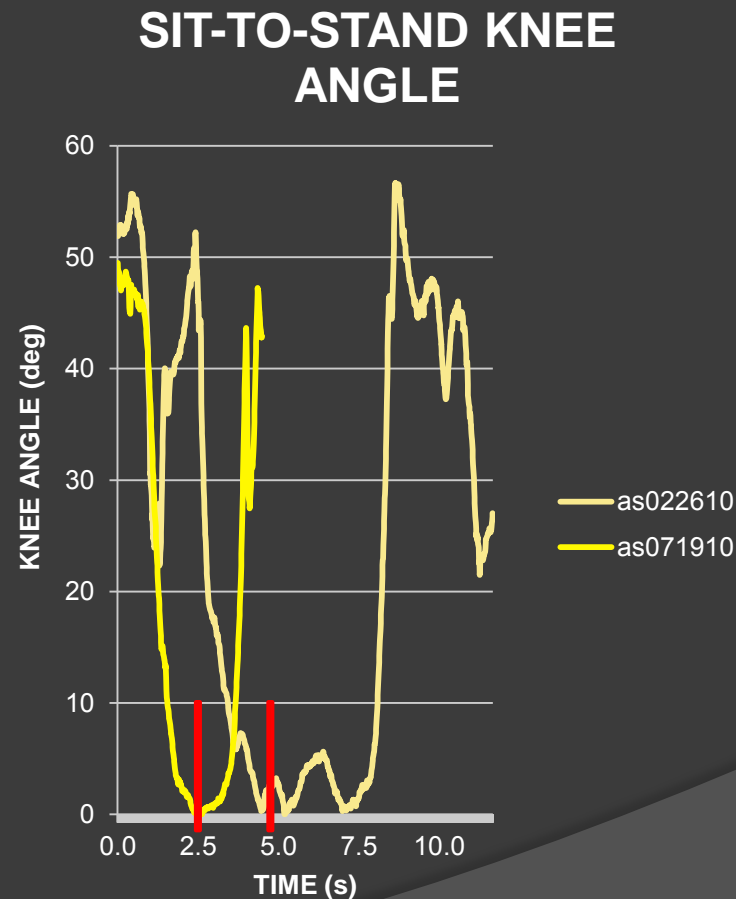
- ⦿ Vicon 8i – 120Hz – 6 camera
- ⦿ Marker placement (26 markers total)
- Data collection
  - Static stand : 5 repetitions
  - Sit-to-stand: 5 repetitions
  - knee-to-mouth: 5 repetitions
  - Ambulation: 30 feet with AD of their choice
- Data imported into Motion Monitor software for processing



SIT-to-STAND

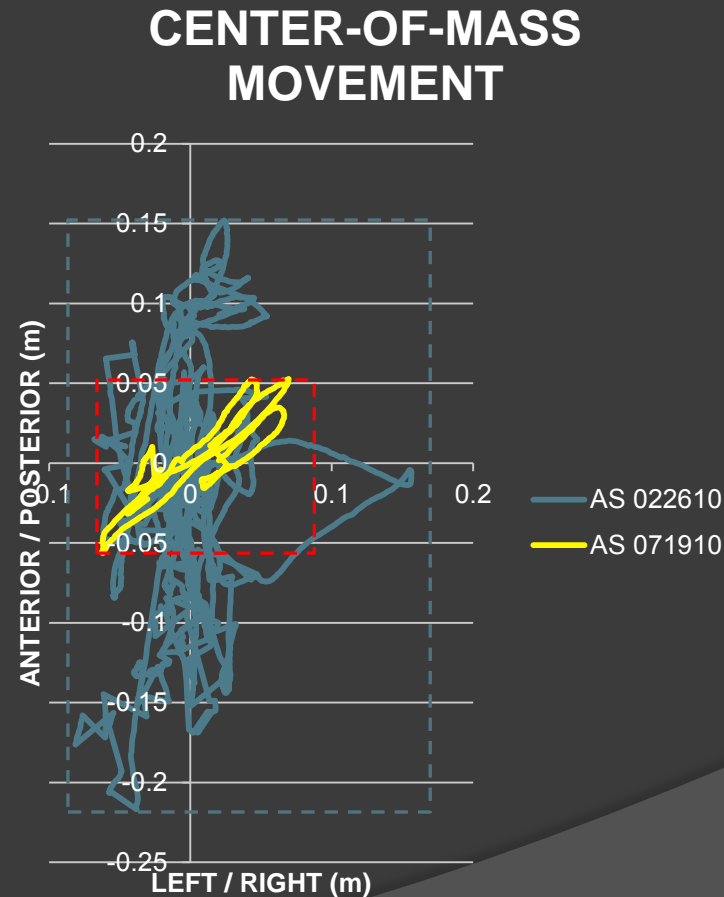
# Results

- Knee angle vs. time and COM movements were compared over time for 5 consecutive activities.
- There was a 47% improvement in time to full extension after 5 months of CE.
- Note – normal sit-to-stand time = 1s.



# Results

- COM excursion during the task decreased
  - 43% in a left/right direction
  - 70% in an anterior/posterior direction.
- Demonstrating improved control.

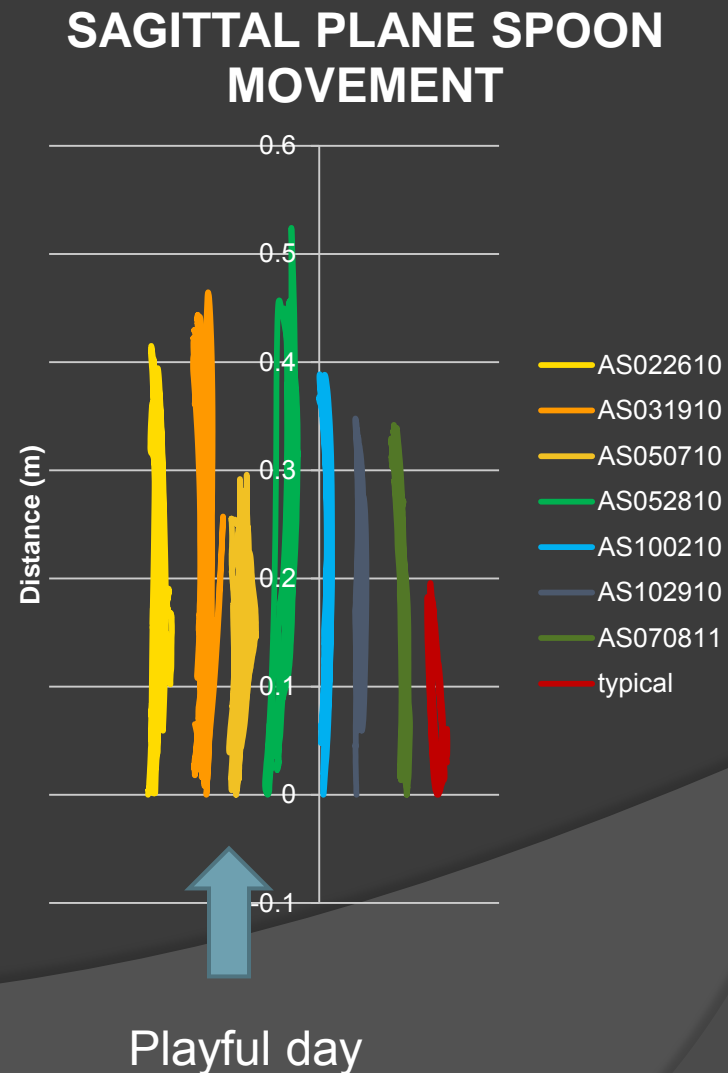




Hand-to-mouth

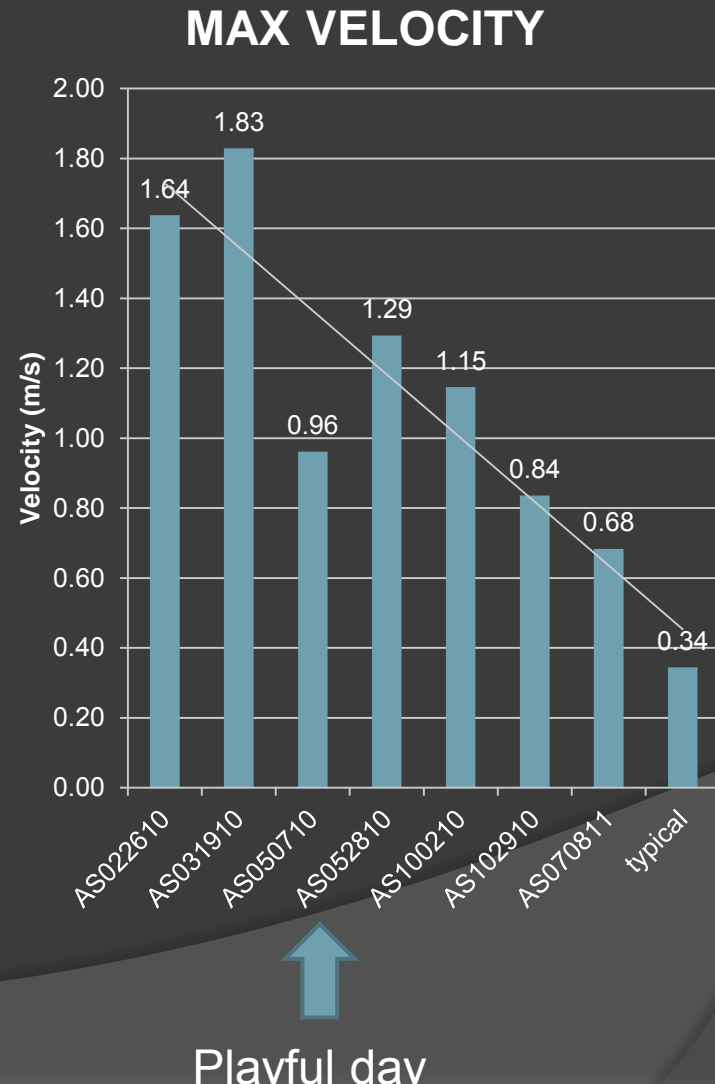
# Results

- These data provide a qualitative look at sagittal plane movement in a temporal format from earliest to last data collection.
  - Subject data are compared to a typical child instructed to perform the same task.
  - The movement patterns appear to become “smoother” with time.
- Observed a marked decrease in cyclic trajectory deviation which suggests improved control.



# Results

- Since the movement distance (from knee-to-mouth) remained constant), these data suggest a shift from more ballistic movements to more controlled movements since the peak velocity is decreasing.



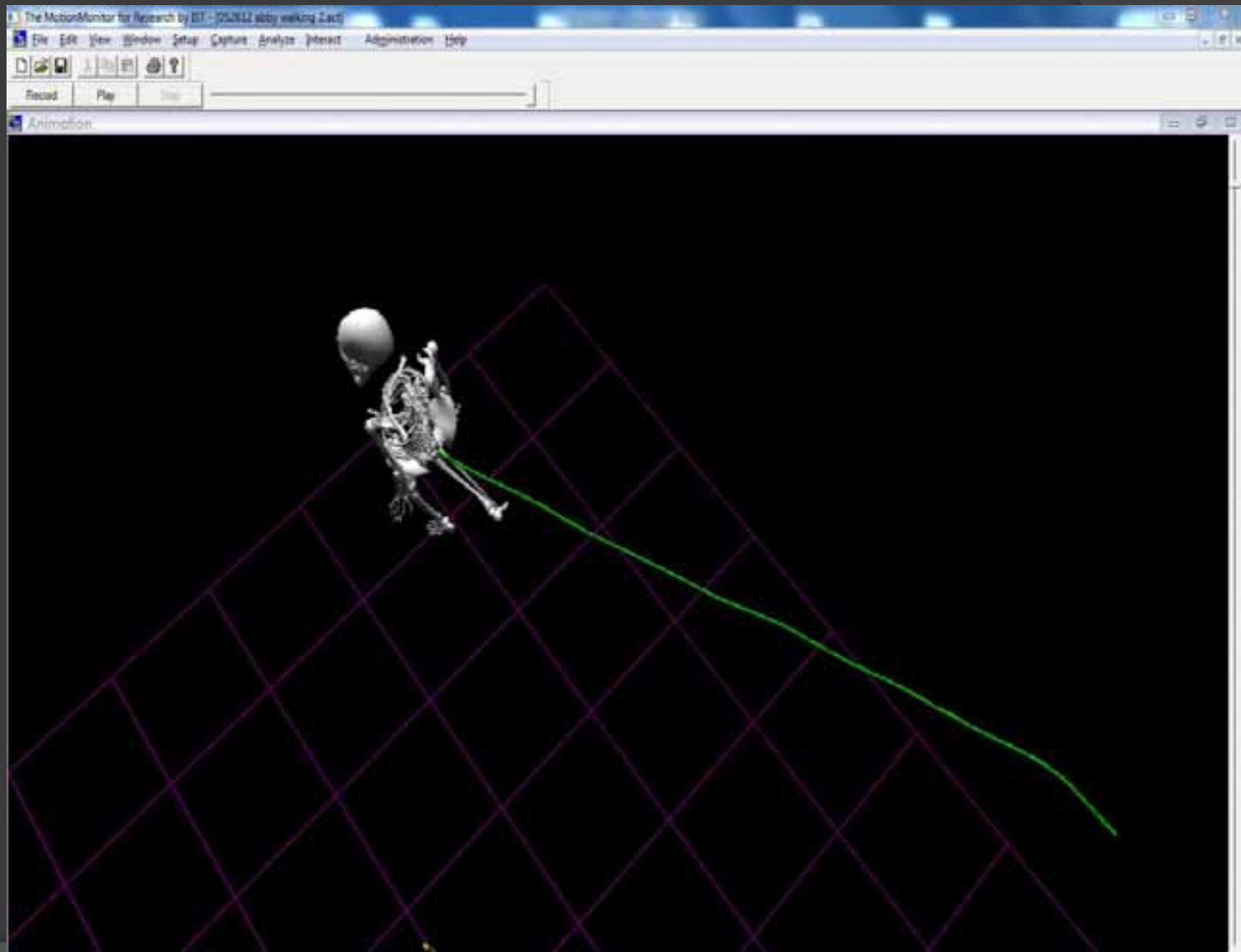
**AMBULATION**

# AMBULATION

## Results

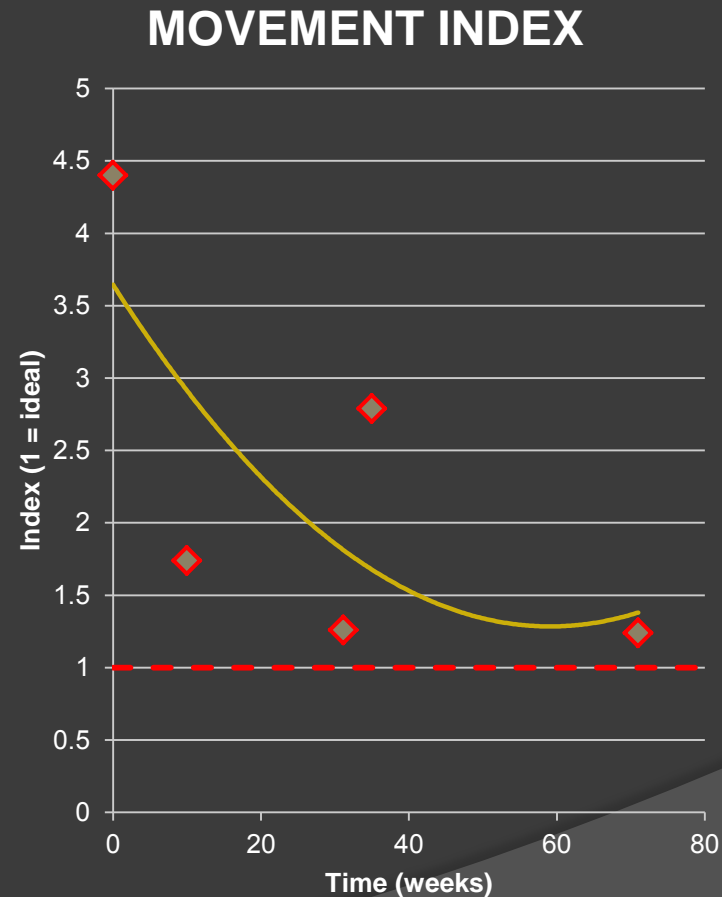
Kinematic metrics were compared for each activity.

Ambulation – The following slide illustrates the COM movement for a child at the beginning and end of a 19 month intervention.



# Results

- Movement index = COM total distance traveled / linear distance
- An index value of 1 = “ideal”. Values > 1 represent non-forward movement.
- Children in TCE demonstrated a decrease in MI from 4.5 to 1.25.
- Children in control group had MI of 3.



# Conclusion

- Children enrolled in TCE demonstrate *increase speed and control* when performing sit-to-stand and hand-to-mouth activities.
- They also demonstrate *normalization of movement patterns* when ambulating. Children in not in CE did not show this improvement.
- The results suggest that TCE provides an opportunity for the child to become *more independent* in specific functional activities.
- Kinematic improvements indicate that *joint alignment and motion are more typical*. – This may reduce atypical joint surface wear and the potential for arthritis and pain as the child develops into an adult.



# Summary

- Children with less involved impairments (GMFCS I, II) will make progress with community based activities and weekly hour long therapy sessions.
- Children with significant motor impairments (GMFCS III, IV, V) require intensive multidimensional services and intervention in order to make similar and better motor progress as their less involved peers.
- If not enrolled in intensive functionally based services, children with severe CP risk not developing to their potential.

CE makes a  
difference in  
maximizing potential  
for children with  
moderate or severe  
motor impairments