



# Distribution of Motor Impairment: Influence on Habitual Walking Activity in Children with Cerebral Palsy—A Pilot Study



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## BACKGROUND & OBJECTIVES

- Limitations in daily walking activity is a dominating clinical problem for ambulatory children with cerebral palsy (CP).
- A broad spectrum of rehabilitation strategies focus on optimizing habitual walking levels and intensity in daily life.
- Habitual walking activity in children with CP decreases as functional impairment increases (Bjornson, 2014), as reported by Gross Motor Function Classification System (GMFCS) levels.
- Little is known about how motor distribution influences habitual walking activity.
- This pilot study aims to examine accelerometry-based habitual walking activity in children with CP by distribution of motor impairment and functional level.

## STUDY DESIGN

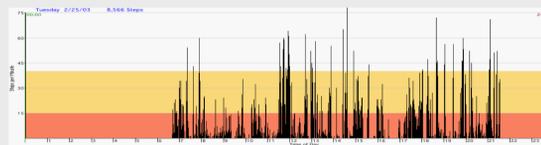
Prospective, observational, cross sectional, cohort study

## SAMPLE

- N = 31 children with cerebral palsy OR delays in gross motor development
- Gross Motor Function Classification System levels
  - I=18
  - II=9
  - III=4
- Average Age = 7.2 years
- 16 (52%) female
- 21 (68%) demonstrated unilateral motor distribution
- Participants were recruited through the Activity Participation sub-study of the multi-site, longitudinal ON TRACK Study

## METHODS

- Habitual walking activity was captured by participants wearing a biaxial StepWatch (SW) accelerometer on their left ankle all their waking hours for a goal of 7+ days (Modus Health, 2015).
- Raw SW data were processed with proprietary software (average of 5 days, 4 week days, 1 weekend day) for the outcomes of average strides/day, percent time walking during waking hours, number of strides greater than 30 strides/min, and peak activity index (Bjornson, 2010).



- GMFCS levels and motor distribution were classified by research therapists during home study visits.
- Walking activity by motor distribution and GMFCS levels were examined with Wilcoxon Sign Rank and Kruskal-Wallis tests.

## RESULTS

- Compared with bilateral distribution, participants with unilateral motor impairment exhibited higher:
  - average strides/day (5338 [1377] vs. 3115 [1359], p<.001)
  - number of strides > 30 stride/min (2282[810] vs. 1000 [744], p <.001)
  - peak activity index (45.6 [5.2] vs. 35.5 [12])
- There was no difference in percent time walking by motor distribution (p= 0.15).
- Percent time walking was greater for children in GMFCS Levels I compared to Level III and level II compared to level III (p < 0.02).
- No significant differences were documented by GMFCS levels for the remaining SW variables (p = 0.17 - 0.24).

## CONCLUSIONS

- This is the first documentation of habitual walking activity by distribution of impairment in ambulatory elementary school-aged children with CP.
- Unilateral motor distribution appears to be associated with higher levels of walking activity and intensity.
- Walking activity by GMFCS results were not consistent with published information (Bjornson, 2014), which may be due to small sample size of lower GMFCS levels.
- Replication with a larger sample and comparison of unilateral distribution to typically developing children is warranted.

## CLINICAL RELEVANCE

- Children with hemiplegia appear to have higher strides/day and spend more time at higher stride rates than children with diplegia.
- Interventions/research to optimize community walking activity should be informed by this information relative community walking goals/outcomes should be informed by this information.

## REFERENCES

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## ACKNOWLEDGEMENTS

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