Gross Motor Function of Non-Ambulatory Young Children with Cerebral Palsy Following a High Dosing Protocol

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Background

- Existing high-dose protocols
  - Constraint-induced movement therapy
  - Locomotor training
  - Several hours each day for many weeks
- Limited information on outcomes for non-ambulatory children

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Study Purpose

- To examine the outcome of a high-dose physical therapy program (STRIVE) for a subset of its participants

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Clinical Program

- STRIVE: Skilled Therapy focused on Repetition, Intensity, Variable practice, and Education
  - 2 hours of treatment per day
  - 5 days per week
  - 4 weeks (40 hours total)
- Individualized treatment strategies
  - Treatment plan focused on two individualized goals
- Motor learning theory

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Methods

- Retrospective chart review of children who completed the STRIVE program
- Outcome measures
  - Gross Motor Function Measure-66 (GMFM-66)
  - Bayley Scales of Infant and Toddler Development-III (BSID-III)

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Subjects

- 12 children (6 males, 6 females)
- Non-ambulatory
- CP, GMFCS levels III-V
- Age
  - Mean: 25.8 months (+/- 11.4 months)
  - Range: 11.2 to 50.1 months

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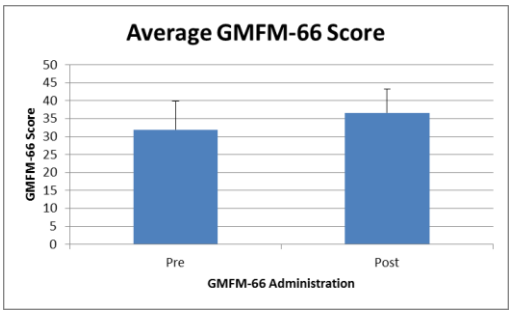
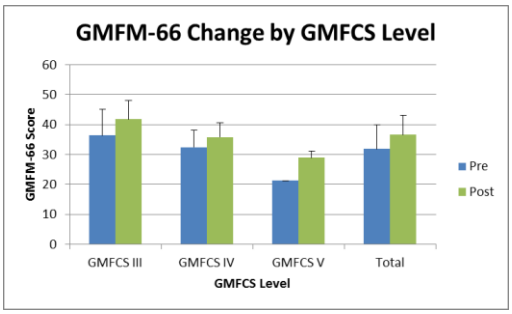
Results

- GMFM-66
  - Mean score pre: 31.91 -/+ 7.97
  - Mean score post: 36.67 -/+ 6.5
  - Paired t-test: t = -5.55, p < .001
  - Significant difference in gross motor skills between pre and post scores



Results

- Mean GMFM-66 change by GMFCS level
  - Level III
    - 4 participants
    - 5.43 point mean change
  - Level IV
    - 6 participants
    - 3.35 point mean change
  - Level V
    - 2 participants
    - 7.68 point mean change



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Results

- Individual GMFM-66 outcomes
  - 8 out of 12 children demonstrated clinically meaningful differences on the GMFM-66
    - Defined as >1.58 point change (Oeffinger et al.)

Oeffinger D, Bagley A, Rogers S, et al. Outcome tools used for ambulatory children with cerebral palsy: Responsiveness and minimum clinically important differences. *Dev Med Child Neurol*. 2008;50(12):918-925.

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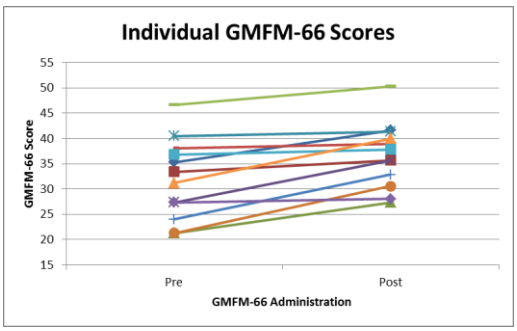

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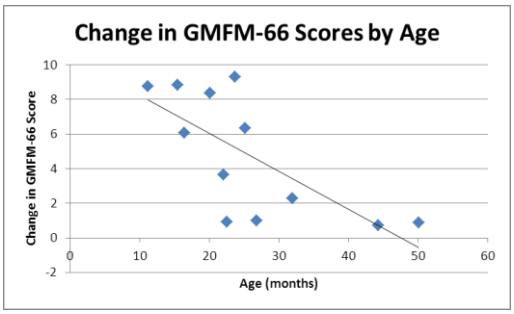
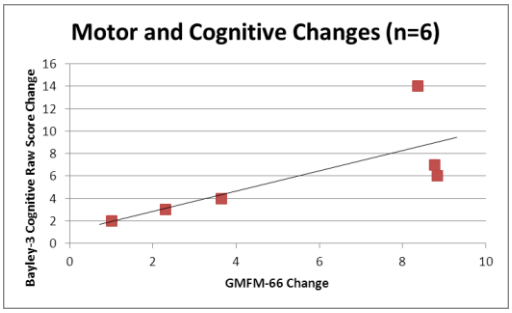
Results

- GMFM-66 scores and age
  - Moderate negative correlation between age and GMFM-66 change score
    - r= -.486, p=.016



Results

- BSID-III
  - Subset of 6 children
  - Cognitive subtest
    - Mean raw score pre: 33.3 -/+ 10.4
    - Mean raw score post: 39.3 -/+ 10.6
    - Paired t-test: t = -3.56, p = 0.009
    - Significant difference in cognitive scores between pre and post



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Conclusions

- High-dose physical therapy protocol
  - Participants experienced significant improvements in gross motor skills
  - Dose (40 hours) is similar to the total dose needed to see meaningful changes in other high-dose protocols
  - Intervention may be implemented as early as 11 months of age

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Significance

- Intensive physical therapy appears to be beneficial for non-ambulatory young children with CP
- A younger age at the start of the program may lead to greater change in motor skills
- Possible improvements in multiple domains of development

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