Sedentary Behaviour in Youth with Cerebral Palsy and Age-, Gender- and Season-Matched Controls

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Cerebral Palsy

• Cerebral palsy (CP) – group of neurologic conditions affecting ~2-3 in 1,000 youth

• Characterized by poor voluntary muscle control and spasticity resulting abnormal movement and posture

• Functional consequences:
  - ↑ chronic pain and fatigue
  - ↓ capacity to perform activities of daily living
  - ↓ habitual physical activity (PA)
  - Sedentary behaviour?
Sedentary Behaviour and Health

• Total sedentary time, independent of PA, is linked with:
  - ↑ overweight/obesity
  - ↑ cardiovascular risk factors
  - ↑ metabolic risk factors

• Patterns of sedentary behaviour may be just as important as the total amount of sedentary time
  - Shorter sedentary “bouts” linked with ↓ metabolic risk factors

• No objective measures of sedentary time or patterns in youth with CP

Objective

To examine sedentary behaviour in a sample of children with CP compared with typically developing youth.
### Methods: Participant Characteristics

- Youth with CP recruited from clinics at the McMaster Children’s Hospital
- Typically developing controls recruited from the local community

<table>
<thead>
<tr>
<th></th>
<th>CP</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (Males)</td>
<td>16 (14)</td>
<td>16 (14)</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>13.1 ± 2.3</td>
<td>13.0 ± 2.5</td>
</tr>
<tr>
<td>GMFCS Level</td>
<td>I = 8</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>II = 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>III = 3</td>
<td></td>
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*Age is presented as mean ± SD. GMFCS = Gross Motor Function Classification System*
Methods: Accelerometry

- Sedentary behaviour measured by accelerometry – ActiGraph GT1M
- Objective measure of activity, recently validated in children with CP
- Worn at the right hip during all waking hours (except water activities)
- Recording for 7 days in 3-sec epochs
  - Minimum monitoring time of ≥ 5 hours on ≥ 4 days
- Activity log used to confirm monitoring time
Methods: Accelerometry

• Measures of:
  - Monitoring time
  - Total sedentary time
  - Bouts of sedentary behaviour (frequency & duration)
  - Breaks from sedentary behaviour (frequency & duration)

• Cut-points developed by Evenson et al. (2008), recently validated for use in youth with CP
  - Sedentary < 100 cpm

Evenson, 2008/Clanchy, 2011
## Results: Sedentary Time

<table>
<thead>
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<th>Control</th>
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<tbody>
<tr>
<td>Monitoring Time (min/d)</td>
<td>716.5 ± 74.9</td>
<td>770.8 ± 58.5</td>
</tr>
<tr>
<td>Sedentary Time (min/d)</td>
<td>579.2 ± 89.0</td>
<td>568.9 ± 81.3</td>
</tr>
<tr>
<td>% Sedentary*</td>
<td>82.3 ± 9.8</td>
<td>73.4 ± 6.3</td>
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</table>

* CP > Control, p < 0.05
Results: Sedentary Bout Frequency

Frequency of sedentary bouts: CP < Control
Results: Sedentary Bout Duration

Duration of sedentary bouts: CP > Control
Results: Breaks from Sedentary Bouts

Frequency of breaks from sedentary: CP < Control
Duration of breaks: CP = Control
Results: CP vs. Matched Control

Cerebral Palsy

Healthy

Sedentary Time

Non-Sedentary Time

< 5 counts/3-sec

5+ counts/3-sec
Discussion

• Sedentary behaviour in youth with CP vs. controls:
  - Similar monitoring time
  - Similar total sedentary time
  - Longer sedentary bouts
  - Less frequent breaks

• Implications for activity promotion in CP?

• Implications for health?
Limitations & Future Directions

- Limitations include:
  - Water activities in CP
  - Small sample size by GMFCS levels
  - Difficulty in assessing activity in Level III and IV*

- Future studies will examine the link between sedentary behaviours and health-related outcomes in this population
Acknowledgements

- Participants & Families
- Stay-FIT Study Group
- Child Health & Exercise Medicine Program

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Thank you!