Rhythmic Auditory Stimulation in gait rehabilitation for children and young people following severe acquired brain injury

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Introduction

- Rhythmic Auditory Stimulation (RAS) uses simple regular rhythms (via metronome or live instruments) to support physical control and improve walking patterns (Thaut & Rice, 2014).
- RAS can improve gait in adults who have had strokes, (Nascimento et al., 2015) and children with Cerebral Palsy (Thaut & Abiru, 2010).
- No previous studies have investigated use of RAS with children and young people (CYP) with acquired brain injury (ABI).

Aim of Study
To investigate whether the addition of RAS to standard physiotherapy improved the walking speed and pattern of CYP with ABI.

Results

- 10mWT: all children demonstrated improvements in 10mWT over the study. For children 1, 2 and 4 the trendline of change was greater in the baseline phase (Fig 1).
- EVGS: Child one improved in the intervention phase. Both Children 2 and 4 showed an improving trajectory in EVGS throughout the study with no noticeable difference in trendline gradient between baseline and intervention phases. For Child 3 there were decelerating trendlines in both phases, but the baseline phase had a steeper trajectory (Fig 2).
- Statistically significant differences between phases in EVGS in child one. No other statistically significant differences.

Patients

<table>
<thead>
<tr>
<th>CYP</th>
<th>Gender</th>
<th>Age at</th>
<th>Injury</th>
<th>Location of</th>
<th>Time since</th>
<th>Physical presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>12</td>
<td>Stroke</td>
<td>Right hemisphere</td>
<td>18</td>
<td>Left hemiplegia</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>12</td>
<td>Traumatic Brain Injury</td>
<td>Diffuse</td>
<td>8</td>
<td>Four limb motor disorder, left side worse than right.</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>10</td>
<td>Hemispherectomy</td>
<td>Left hemisphere</td>
<td>23</td>
<td>Right hemiplegia</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>10</td>
<td>Stroke</td>
<td>Left hemisphere</td>
<td>8</td>
<td>Right hemiplegia</td>
</tr>
</tbody>
</table>

- All children able to walk 10m without physical assistance (+/- aids and/or orthotics), follow simple commands and have walking based goals.

Figure 1: 10mWT scores for the four children taken at the beginning of sessions throughout the study

Figure 2: EVGS scores for the four children taken at the beginning of sessions throughout the study

Conclusion

- RAS may be effective in targeting gait speed and quality in children with ABI, and could be considered alongside other gait interventions.
- Studies investigating RAS in larger doses, and in a cross over design are required to establish the efficacy of RAS with CYP with ABI, and which group of children will gain the most benefit from RAS.
- Research in this low incidence, highly heterogenous population who are on an improving trajectory is challenging, but necessary to ensure treatments offer optimal benefits.

References

- Nascimento et al 2019 Journal of physiotherapy, 6(1),1015
- Thaut and Abiru 2010 Music Perception, 27, 4, pp. 263-269

www.thechildrenstrust.org.uk/presentations-and-publications