Immediate Effect of Suit (Suit Therapy) on Sitting Postural Control in Children with Cerebral Palsy

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Background /Purpose

Recently, types of orthotic garments or suits have been included in intensive therapy programs for children with Cerebral Palsy (CP). Theoretically, suits can accelerate progress, incorporating bungee cords to provide resistance, facilitation, and stability. There is little to no scientific evidence to support the suit’s ability to improve motor outcomes or posture (BAILES ET AL., 2011). Our purpose was to investigate the immediate effects of wearing the suit on sitting posture in different sensory conditions in children with CP.

Materials /Methods

Participants:

Children with spastic CP with a Gross Motor Functional Classification System (GMFCS) Level III and IV were recruited from regional treatment centers. All children had a normal or corrected-to-normal vision and hearing. Children who had surgery in the last 6 months were excluded.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Gender</th>
<th>Age (years) Mean±SD</th>
<th>Weight (Kg) Mean±SD</th>
<th>GMFCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>9 (M)</td>
<td>9.27±2.20</td>
<td>30.76±10.6</td>
<td>III (10)</td>
</tr>
<tr>
<td>9 (F)</td>
<td></td>
<td></td>
<td></td>
<td>IV (8)</td>
</tr>
</tbody>
</table>

Table 1: Participants’ Characteristics- M-male; F-female; SD-Standard Deviation

Procedures:

- Children were asked to sit on a stool without back and foot support which was positioned on a force plate Berteç-FP4060-05 (100Hz).
- Participants fixated on a target located 1-m in front of them at eye level (DONKER ET AL., 2008; CIGNETTI ET AL., 2011).
- Four randomized quiet sitting conditions were evaluated: eyes open (EO) and eyes closed (EC), each without (Control) and with (Suit) wearing an orthotic suit.
- Suit and elastic cord patterns were individualized for each child, and fit according to the most standard protocol based on children’s height/weight.
- Each condition was maintained for 20 seconds. There was a rest period of 30-50 seconds between each trial.
- We assessed area of Center of Pressure (CoP), medial-lateral and anterior-posterior amplitude, mean velocity, medial-lateral and anterior-posterior approximate entropy (ApEn).

Analysis:

Linear Mixed Model including Conditions and Suit (fixed factors), and Subject and Trial (random factors) was used at R-lme4 package. Level of significance was set at p < 0.05.

Results

We found a significant decrease in ML amplitude (<0.05) for EO and EC for GMFCS III and for EC for GMFCS IV when wearing the suit. There was a decrease in area of CoP in EC with suit for GMFCS IV (-0.345; p=0.018). Increases of ML ApEn were obtained when children GMFCS III (+0.092; p=0.006) and IV (+0.105; p=0.028) were wearing the suit with EC.

Conclusions

The present study demonstrates that suit affects the control of sitting posture in children with CP; decreasing amount of variability, but improves complexity especially in conditions demanding sensory adaptability.

Clinical Relevance:

While additional research is needed, this study suggests that the Suit may challenge children with CP to use different postural control mechanisms, which may complement the goals of some clinical practices such as training for posture stabilization.

References


