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RELIABILITY OF GAIT DEVIATION INDEX IN CHILDREN WITH SPASTIC CEREBRAL PALSY

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AIM
The aim of this study is to investigate intra-assessor reliability of Gait Deviation Index in children with spastic cerebral palsy across two repeated sessions.

CONCLUSIONS
The present observed moderate to good reliability holds promise for the use of GDI as an outcome in clinical research.

INTRODUCTION AND AIM
Children with cerebral palsy (CP) often exhibit an altered gait pattern. Instrumented gait analysis (IGA) is used to describe specific gait pattern and impairments.

Gait Deviation Index (GDI) is based upon kinematic data from the IGA, and is an overall quantitative index that summarizes the overall gait function into a single score for right and left side of the body for each patient.

Satisfactory concurrent validity and construct validity of the GDI have been shown in children with CP. However, test-retest intra-assessor reliability of GDI in children with CP has not previously been investigated.

The aim of this study is to investigate intra-assessor reliability of Gait Deviation Index in children with spastic CP across two repeated sessions.

METHODS
18 children (mean age 7.98 years, SD 2.11) with spastic CP (10 unilateral and 8 bilateral), at GMFCS level I and II (9 children at each level).

For intra-assessor reliability IGA was completed by one out of three assessor teams (figure 1) on two different days, separated by 0-9 days. The children walked at a self-selected walking speed.

The IGA was performed using a 6-camera Vicon MX system, Oxford, UK movement analysis system (100 Hz) with the Plug-in-Gait marker set.

The GDI score of five successfully trials, with consistent velocity (± 15%), were obtained and the median GDI score for each child on the left and right side (a total of 72 GDI scores) were used for further analysis.

Intra-assessor reliability was investigated with Bland-Altman plots, calculation of Intraclass correlation coefficient (ICC), Standard error of measure (SEM), and smallest detectable change (SDC) based on 95% confidence intervals.

RESULTS AND CONCLUSION
The reliability for GDI for children with CP was found to be moderate to good. The smallest detectable change with 95% confidence interval was found to be 12.7 to 17.4 points (Table 1). No significant learning effect and/or systematic bias were observed in the Bland-Altman plot between test and retest (Figure 2). Furthermore the SEM 95% confidence interval included zero.

The present observed moderate to good reliability holds promise for the use of GDI as an outcome in clinical research.

<table>
<thead>
<tr>
<th>Assessor</th>
<th>Legs (N)</th>
<th>Mean S1 (SD)</th>
<th>Mean S2 (SD)</th>
<th>Diff. (SD)</th>
<th>ICC [95%CI]</th>
<th>SEM [95%CI]</th>
<th>SDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall scores</td>
<td>36</td>
<td>79.1 (12)</td>
<td>79.4 (12)</td>
<td>-0.3 (7)</td>
<td>0.81 [0.7-0.9]</td>
<td>5.3 [-5.1-15.8]</td>
<td>14.7</td>
</tr>
<tr>
<td>Team A</td>
<td>10</td>
<td>78.6 (15)</td>
<td>81.2 (13)</td>
<td>-2.6 (9)</td>
<td>0.80 [0.6-1.0]</td>
<td>6.3 [-6.0-18.6]</td>
<td>17.4</td>
</tr>
<tr>
<td>Team B</td>
<td>14</td>
<td>75.8 (10)</td>
<td>74.0 (10)</td>
<td>1.8 (7)</td>
<td>0.74 [0.6-0.9]</td>
<td>5.2 [-5.0-15.3]</td>
<td>14.3</td>
</tr>
<tr>
<td>Team C</td>
<td>12</td>
<td>83.4 (11)</td>
<td>84.3 (13)</td>
<td>-0.9 (7)</td>
<td>0.84 [0.8-1.0]</td>
<td>4.6 [-4.4-13.6]</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Abbreviations: S1: Session 1; S2: Session 2; Diff.: Mean difference; ICC: Intraclass correlation coefficient, SEM: Standard error of measure, and SDC: smallest detectable change.

Figure 1 Laboratory staff and teams
For intra-assessor reliability IGA was completed by one out of three assessor teams.

Figure 2 Bland-Altman plot
Bland-Altman plot of the 72 GDI scores with mean (black dashed line), 95% limits of agreement as the mean difference ± 1.96 SD (black dotted line) and 95% CI (grey line).