Relationship Between Upper Extremity Selective Motor Control and Upper Extremity Functions in Children with Spastic Cerebral Palsy

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Abstract

- Crebral palsy (CP) is a disorder in the development of movement and posture, which is caused by non-progressive damage in the fetal or infant brain that is continuing its development.

- Abnormal posture and deformities caused by spasticity in children with spastic CP, weakness in muscle strength and movement, deficiency in sensory-motor perception and a decrease in selective motor control limit the functions of upper extremity.

- Approximately 60% of children with CP have upper extremity dysfunction.

- Selective Motor Control (SMC) is defined as isolated muscle activation during a voluntary posture or movement in a selected motion pattern.

- Therefore, selective motor control should be considered during evaluation and rehabilitation of affected upper extremity functions in children with spastic CP. However, there are not enough studies in the literature.

Aim

The aim of this study is to investigate the relationship between upper extremity selective motor control and upper extremity functions in children with spastic CP.

Material and Methods

- The study included 36 volunteer children (17 girls, 19 boys) with spastic CP, ranging in age from 3 to 18 years.

- Upper extremity abilities of the children who fulfilled the inclusion criteria were determined by Manual Ability Classification System (MACS) scale and the upper extremity performances were determined by ABILHAND-Kids scale.

- In order to evaluate the selective motor control of the upper extremity, Test of Arm Selective Control (TASC) scale was applied via video recording.

- The relationship between TASC total score and ABILHAND-Kids total score and the relationship between TASC total score and MACS score was examined by using the Spearman correlation test.

Results

- According to the results of the study, when MACS, ABILHAND-Kids and TASC total scores were compared in right and left hemiplegia, diplegia and quadriplegia groups, no statistically significant difference was found between the four groups (p>0.05) (Table 1).

- There was a statistically significant difference between the diplegic and quadriplegic groups in TASC total scores (p<0.05).

- A very strong positive correlation was found between TASC total score and ABILHAND-Kids total score (r: 0.750; p<0.001). A very strong negative correlation was found between TASC total score and MACS score (r: -0.780 p< 0.001) (Table 2).

Table 1 - The Demographic Properties of the Participants

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Right Hemiplegic</th>
<th>Left Hemiplegic</th>
<th>Diplegic</th>
<th>Quadriplegic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean years)</td>
<td>10.64±2.90</td>
<td>11.20±2.70</td>
<td>9.18±4.04</td>
<td>11.67±2.55</td>
<td>0.49*</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girls (%)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>0.90*</td>
</tr>
<tr>
<td>Boys (%)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MACS (mean)</td>
<td>2.09±1.21</td>
<td>1.70±0.67</td>
<td>1.30±0.50</td>
<td>2.67±0.57</td>
<td>0.08*</td>
</tr>
<tr>
<td>ABILHAND-Kids (mean)</td>
<td>27.09±8.00</td>
<td>26.14±8.00</td>
<td>24.68±3.35</td>
<td>21.69±1.00</td>
<td>0.15*</td>
</tr>
<tr>
<td>TASC (mean)</td>
<td>10.09±4.32</td>
<td>10.60±5.56</td>
<td>12.45±3.41</td>
<td>5.87±2.50</td>
<td>0.08*</td>
</tr>
</tbody>
</table>


Table 2 - The Relationship Between TASC, MACS and ABILHAND-Kids

<table>
<thead>
<tr>
<th></th>
<th>MACS</th>
<th>ABILHAND-Kids</th>
</tr>
</thead>
<tbody>
<tr>
<td>TASC</td>
<td>r value</td>
<td>p value</td>
</tr>
<tr>
<td></td>
<td>0.78</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*Pearson Test, TASC: Test of Arm Selective Control.

Conclusion

- The results show that there is a relationship between selective motor control and upper extremity functions in children with spastic type cerebral palsy.

- Therefore, it was thought that selective motor control should be taken into consideration when evaluating upper extremity functions in children with spastic CP, and it was also thought that upper extremity functions could be adversely affected in children with insufficient selective control.

References


