ANALYSIS OF THE CORE STABILITY TO IMPROVE SINGLE LEG STANCE (CASE STUDY)

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ABSTRACT

The purpose of this case study was to understand if the increasing of the core stability improves single leg stance, according to the Bobath concept in the evaluation and treatment of an adult subjected to a stroke. Three assessments were recorded with photographic evidence: (i)-image analysis according to 3D motion capture system, (ii)-registration on a force plate of ground reaction force, and (iii)-the migration of centre of mass. This case study showed that improving core stability increases postural control and improves postural alignment of the trunk, and consequently single leg stance.

Keywords: core stability; single leg stance; postural control; Bobath concept.

INTRODUCTION

The human movements are organized in a framework of postural control through patterns of movement or adaptations in muscles, which result, for example, from feedforward mechanisms. Anticipatory postural adjustments (APAs) prepare the body for expected movement displacements and therefore are important in maintaining postural orientation before functional activity (pAPAs) (Schepens & Drew, 2004). APAs enable efficient postural alignment and central stability, and it has been shown that appropriate core muscle recruitment can increase the capacity of muscle activation in the extremities (Kibler et al., 2006).

A key element of rehabilitation intervention is to ensure that muscle activation patterns producing pAPAs resulting in, for example, improved core stability are being appropriately recruited during re-education of efficient functional activity (Raine et al., 2009).

A middle age female with a stroke episode participated in this case study. Three assessments were performed, based upon image analysis of 3D motion captures in sequence Sit-to-Stand (STS) and right Single Leg Stance (SLS) in 3 views, registration of the ground reaction by a force plate, and the migration of the centre of mass. These assessments were interspersed with an intervention program in neurological disorder according to the Bobath concept. To complement the assessment, photographic evidence was also considered; a Mini-BESTest, Timed Up & Go (TUG), timed STS and timed SLS were performed.

The case study intervention used techniques based on conceptual thinking and clinical reasoning according to the Bobath Concept, and aimed at optimizing postural and movement strategies to improve efficiency and maximize function.
RESULTS AND CONCLUSIONS
The results from the force distribution between left and right feet in standing are presented in table 1, which shows improved weight bearing over left lower limb. Fig. 1 and Fig. 2 show more symmetrical load distribution after the intervention program, between M0 and M2.

Table 2 - Force distribution between left and right feet in standing

<table>
<thead>
<tr>
<th>Moment</th>
<th>Left foot force (N)</th>
<th>Right foot force (N)</th>
<th>Total force (N)</th>
<th>Left foot force percentage</th>
<th>Right foot force percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
<td>160.481</td>
<td>311.1526</td>
<td>471.6337</td>
<td>34.03%</td>
<td>65.97%</td>
</tr>
<tr>
<td>M1</td>
<td>206.9931</td>
<td>262.8141</td>
<td>469.8072</td>
<td>44.06%</td>
<td>55.94%</td>
</tr>
<tr>
<td>M2</td>
<td>267.9521</td>
<td>197.616</td>
<td>465.5681</td>
<td>57.55%</td>
<td>42.45%</td>
</tr>
</tbody>
</table>

Fig. 1 - Location of the centre of gravity location in standing position in M0, M1 and M2 (top view).

Fig. 2 - Photographic evidence STS in M0, M1, M2 in stage 4

This case study shows that an increase of postural muscle activity within the core musculature enables more involvement of the lower limbs during sitting and standing.

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REFERENCES