Virtual reality-based dance for upper extremity rehabilitation in community-dwelling chronic stroke survivors

Savitha Subramaniam, PT, MS; Tanvi Bhatt, PT, PhD
Physical Therapy Dept, University of Illinois at Chicago (UIC), Chicago, IL 60612

BACKGROUND
Recent rehabilitation literature has demonstrated that increase in repetitive practice and knowledge of performance improves motor learning and recovery. While several studies have studied upper extremity function on various rehabilitation methods, no one has yet studied the effect of a virtual reality-dance based training for community-dwelling chronic stroke survivors.

The purpose of this study was to quantify the effect of virtual reality-based dance training on the paretic upper extremity movement control on a reliable multi-planar, stand-reaching (i.e. functional) task in both flexion- and abduction directions.

METHODS

Table 1: Demographics

<table>
<thead>
<tr>
<th>Subject</th>
<th>Gender</th>
<th>Age (years)</th>
<th>Weight (kg)</th>
<th>Height (cm)</th>
<th>Involved side (LL/LR)</th>
<th>Stroke type (HI/II)</th>
<th>Onset (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>60.75</td>
<td>93.48</td>
<td>169.27</td>
<td>R</td>
<td>I</td>
<td>9.72</td>
</tr>
<tr>
<td>N = 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

LABORATORY TESTS
Subjects performed 3 trials of cued flexion and abduction target reaching after 3 familiarization trials (custom apparatus and outcomes measures shown below (1)).

OUTCOME MEASURE

PRE­ WO - POST­ WO

BACKGROUND

• Post-training, individuals with chronic stroke demonstrated a significant improvement in reaction time, peak acceleration and movement time from pre­ to post-session (p < 0.05) for flexion- reaching movements.

• Similar improvements where seen in abduction-reaching movements although there was no significance between pre- to post-session (p > 0.079) and (p > 0.083) for movement initiation time and peak acceleration time respectively. Since the peak acceleration is expected to increase post-intervention, greater values indicated positive change with intervention.

Table 2: Clinical scales

<table>
<thead>
<tr>
<th>BBS (56)</th>
<th>6MWT</th>
<th>TUG</th>
<th>FES</th>
<th>CMI (29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Pre-Test</td>
<td>48.89 (2.57)</td>
<td>386.2 (82.36)</td>
<td>24.56 (2.92)</td>
<td>16 (3.082)</td>
</tr>
<tr>
<td>Post-Test</td>
<td>52.25 (2.12)</td>
<td>373.63 (106.44)</td>
<td>22.25 (3.80)</td>
<td>14 (3.51)</td>
</tr>
</tbody>
</table>

REFERENCES


CONCLUSION

The results provide evidence that virtual reality-based dance intervention rehabilitation paradigms that integrate repetitive practice and knowledge of performance have the potential to optimize motor learning and recovery.

RESULTS

• Results, whilst encouraging, indicate that future studies with larger sample sizes and longer duration are necessary to determine it's efficacy.

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