Introduction

It is well researched that when instructions are given to either focus on something external to the body, i.e., the effect the movement has (external focus), better performance is observed than when one is instructed to focus on their body's movements (internal focus) (Wulf, Shea, & Park, 2001). Postural control has been previously understood to be a relatively automatic skill that requires little attention, and adjustments to balance are said to be small, quick, reflexive actions (Wulf & Prinz, 2001). According to the constrained action hypothesis, when one focuses internally and attempts to actively maintain balance, it intervenes with the inherent motor processes involved with balance, and so, by focusing externally, it allows unconscious processes to control the movement or lack thereof (Wulf, McNevin, & Shea, 2001).

The purpose of this study was to examine the influence of attentional focus on balance, and the maintenance of posture in healthy older adults over the age of 65. Participants were to perform an external focus task, an internal focus task, and a cognitive counting task.

It was hypothesized that the cognitive counting task (CCT) will have center of pressure (COP) measures that show less swaying, which would indicate the best maintenance of posture and balance of the three conditions.

Methods

Participants: 16 elderly participants were tested on the 3 experimental conditions (Table 1). The inclusion criteria consisted of having no history of frequent falls; no lower body injury or recent surgery; the ability to stand up without support while performing a cognitive task, and no other deficits that might interfere with balance.

Procedures: Participants were asked to stand on a steady AMTI force plate platform, which measured center of pressure (COP) at a sampling frequency of 500 Hz. The participants alternated through three randomly assigned blocked conditions. The conditions consisted of: minimize the movement of the hips (internal focus); minimize the movement of markers placed on the hips (external focus); and lastly focus on a cognitive counting task. Six trials that were one minute in length were completed for each of the 3 conditions. Participants were asked out of 100% how much attention they spent on the focus tasks, if less than 60% the trial was repeated.

Analysis: The force plate data was processed using MATLAB software. COP displacement in the anterior-posterior (AP) and medial-lateral (ML) directions, COP SD in the AP and ML directions, COP Path Length, and 95% Area ellipse (area) measures were calculated for each postural test. Trials were averaged for each experimental condition and using Statistica, a one way ANOVA with repeated measures test was performed. Finally a post hoc LSD analysis was executed if significance was observed.

Table 1. Summary of participants.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Mean ± SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>71.67±6.11</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>72±4.32</td>
<td>13</td>
</tr>
</tbody>
</table>

Conclusion

The results of this study support the hypothesis. It was observed that during the cognitive task the area and SD (variability) in COP values were significantly less than the values found in the two focus tasks indicating that there is less swaying occurring and therefore better balance. This is of interest as it highlights a method in which a person may improve their stability. This could be particularly important for aged populations where the risk of falling is larger. The next step is to use these results in the implementation of an intervention program with the aim of teaching at risk individuals that focusing on your movement is not always best for balance.

References