FEASIBILITY OF C-MILL GAIT-ADAPTABILITY TRAINING IN OLDER ADULTS AFTER FALL-RELATED HIP FRACTURE: USER’S PERSPECTIVE AND TRAINING CONTENT

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INTRODUCTION: The ability to make step adjustments during walking, termed ‘gait adaptability’, is often reduced in older adults, which increases their risk for falling. This study aimed to evaluate content and user experience of gait-adaptability training on an innovative rehabilitation treadmill augmented with visual context (C-Mill, Figure 1) for older adults recovering from a fall-related hip fracture.

METHODS: Fifty-seven older adults (83±7yrs) with fall-related hip fracture were randomly allocated to 6 weeks of C-Mill training (N=19), conventional treadmill training (N=19) or conventional overground gait training (N=19). Participant’s experience with training was evaluated with a purpose-designed questionnaire. Walking duration, speed, distance and number of steps taken during training were registered by the instrumented treadmill for C-Mill and conventional treadmill groups. Walking duration and number of steps taken during a single overground gait-training session were manually assessed by two observers in a group of 38 representative older adults (81±7yrs).

RESULTS: All training groups rated the training useful, motivating, fun, challenging and enjoyable (median scores ≥7 on a 10-point scale, no differences; all p>0.05). Training content is presented in Table 1.

CONCLUSIONS: C-Mill gait-adaptability training was well-received by older adults recovering from a fall-related hip fracture. Moreover, C-Mill gait-adaptability training allowed for task-specific practice of gait adjustments at a higher practice intensity than overground gait training (twice as many steps). In this ongoing trial (van Ooijen et al. BMC Geriatrics 2013,13:34), the relative efficacy of the three forms of gait training on gait, fear of falling and actual falls will be examined.

Figure 1. C-Mill

The C-Mill elicits step adjustments during walking by projecting virtual context on the belt’s surface (A). C-Mill gait adaptability exercises include visually guided stepping to a sequence of regular or irregular stepping targets (B), obstacle avoidance (C), speeding up and slowing down by maintaining position in a moving walking zone (D), and all of the above in a functional and interactive gait adaptability game (E).
Table 1. Characteristics of the three forms of gait training

<table>
<thead>
<tr>
<th></th>
<th>Conventional treadmill training</th>
<th>C-Mill gait adaptability training</th>
<th>Overground gait training (additional group)</th>
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</thead>
<tbody>
<tr>
<td>Number of steps</td>
<td>798 (417-1416)^a</td>
<td>814 (426-1175)^b</td>
<td>343 (90-1180)^AB</td>
</tr>
<tr>
<td>Walking duration (min)</td>
<td>10.5 (5.6-15.0)</td>
<td>12.5 (6.8-14.1)^c</td>
<td>8.5 (2.3-17.9)^c</td>
</tr>
<tr>
<td>Walking distance (m)</td>
<td>266 (89-417)</td>
<td>321 (97-476)</td>
<td>-</td>
</tr>
<tr>
<td>Walking speed (km/h)</td>
<td>1.5 (0.9-2.0)</td>
<td>1.6 (0.9-2.2)</td>
<td>-</td>
</tr>
</tbody>
</table>

Results are presented as median (minimum – maximum). ^aSignificant difference between groups, p < 0.001. ^c p = 0.017.