Effect of a Supervised Hip Flexor-Stretching Program on Gait in Healthy Elders


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INTRODUCTION

We have previously shown, using 3-D motion analysis techniques, that reduced peak hip extension during walking is consistently found in elderly people when compared to young adults and is associated with hip flexion contracture [1, 2]. We have also previously shown moderate gait improvements from a twice-daily 10-week unsupervised hip flexor stretching program [3]. The purpose of this study was to evaluate the efficacy of a supervised, rigorous 10-week hip flexor stretching program in increasing passive hip extension and increasing hip extension, reducing peak anterior pelvic tilt and increasing stride length during walking in those with age-related reductions in peak hip extension.

METHODS

Eighty-two healthy elderly subjects (age 65-87 yrs) completed the study and were randomized to one of two study groups. A treatment group (n=43) completed a 10-week twice-daily hip flexor stretching program which was supervised twice weekly by a rehabilitation clinician. A control group (n=39) completed a 10-week shoulder stretching program. Pre- and post- intervention measures of passive hip extension range of motion and dynamic gait parameters during walking were taken. A 10-camera Vicon motion analysis system (Vicon Peak, Centennial, CO) and in-ground AMTI force plates (AMTI, Watertown, MA, USA) were used to collect kinematic and ground reaction force data during walking. The primary outcome parameters were passive hip extension range of motion, and peak hip extension, peak anterior pelvic tilt and stride length during walking. Paired samples t-tests were used to compare pre- and post-intervention values.

RESULTS AND DISCUSSION

The treatment group showed significant improvements in passive hip extension range of motion (p = 0.007) while the control group did not. Also, subjects in the treatment group who presented with limited pre-assessment peak hip extension during walking (n_{treatment}=32, n_{control}=33) had increased stride length (p = 0.019), peak hip extension (p = 0.012) and decreased anterior pelvic tilt (p = 0.006) during walking, while subjects in the control group showed only decreased anterior pelvic tilt (p = 0.013) (Table 1).

As hypothesized, a supervised hip flexor stretching program was effective in increasing stride length and peak hip extension and reducing anterior pelvic tilt during walking in healthy elderly adults with limited pre-intervention hip extension. The results of this study are in agreement with previous findings, which have indicated that stretches involving the hip can significantly alter hip extension, anterior pelvic tilt, stride length during walking [4-6]. However, this study demonstrates that a stretching program focused on a single muscle group can have the same or greater effects, and the results further implicate hip flexor tightness as a key to explaining age-related decline in gait function. This study also highlights the importance of supervision in achieving good results from a stretching program.

CONCLUSIONS

The results of this study support the use of a simple hip flexor stretching program in healthy elders with age related decline in gait function associated with hip flexor tightness.
REFERENCES


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive Hip Extension (deg)</td>
<td>12.0 ± 6.2</td>
<td>15.3 ± 4.9*</td>
</tr>
<tr>
<td>Peak Hip Extension (deg)</td>
<td>7.6 ± 6.0</td>
<td>11.7 ± 8.5*</td>
</tr>
<tr>
<td>Peak Anterior Pelvic Tilt (deg)</td>
<td>15.8 ± 5.6</td>
<td>11.9 ± 5.2*</td>
</tr>
<tr>
<td>Stride Length (m)</td>
<td>1.41 ± 0.21</td>
<td>1.44 ± 0.20*</td>
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</tbody>
</table>

*indicates a value that is significantly different from the pre-intervention value, with p<0.05.