Tai Chi Exercise on Muscle Strength and Physical Function in Peripheral Neuropathy Patients

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Tai Chi Exercise on Muscle Strength and Physical Function in Peripheral Neuropathy Patients

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ABSTRACT

An estimated 20 million people in the U.S. suffer from peripheral neuropathy (PN). Patients with PN develop gait abnormalities. Foot pain is one of the factors affecting walking ability. As a result, a large number of individuals with PN suffer from a reduction in daily physical activity and reduced quality of life. Tai Chi appears to be safe and effective in promoting strength and functional capacity in older patients with other chronic disabilities. Purpose: This study aimed to assess the effects of Tai Chi on muscle strength and physical function in patients with PN.

METHODS: Thirty seven participants (men=21, women=16) were randomly assigned to either Tai Chi exercise (Ex, n=20) or control group (Con, n=17). All participants signed informed consents prior to testing.

Exercise Program
Exercise consisted of 12-week progressive Tai Chi (i.e., Yang Style), offered 3 times per week, 60 minutes each time. A typical Tai Chi practice session was 60 minutes long, included diaphragmatic breathing and gentle stretching exercises for warm-up (10 min), learning and practicing Tai Chi Yang Style 10 forms (45 min), and cool down (5 min). All classes were taught by a Tai Chi Master.

Assessments
One Repetition Maximum (1RM): One RM was conducted on weight machines (i.e., Life Fitness) designed for lower body (i.e., leg extension, and leg curl) muscle groups. Participants were asked to lift one the heaviest weight they were able to lift within their comfort level.

Time of 8 Foot up and Go (TUG): This test was used to assess agility, coordination and dynamic balance. The test requires standing up from a chair, walking eight feet, turning and walking back to the chair as quickly as possible.

Six minute walk test (6MW): Participants were instructed to walk at their own pace trying to cover as much distance as possible in 6 minutes on an indoor track. To standardize the protocol, the participants were not coached during the test, but made aware of time remaining to completion. The distance covered was recorded to the nearest meter.

RESULTS

Participant Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Con (m=17)</th>
<th>Ex (m=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td>75 ± 9.02</td>
<td>71 ± 9.50</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>170 ± 12.04</td>
<td>173 ± 6.63</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>83 ± 20.15</td>
<td>87 ± 12.92</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>28 ± 5.69</td>
<td>29 ± 3.82</td>
</tr>
</tbody>
</table>

Table 1. Values are means ± SD.

Changes in lower muscle strength (pre and post)

<table>
<thead>
<tr>
<th>RM-1 Leg Extension (kg)</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Con</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < 0.05 vs. Pre

Figure 1. One repetition maximum (1RM) leg extension. Values are means ± S.E.

<table>
<thead>
<tr>
<th>RM-1 Leg Curl (kg)</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Con</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ex</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < 0.05 vs. Pre

Figure 2. One repetition maximum (1RM) leg curl. Values are mean ± S.E.

CONCLUSIONS

These findings demonstrated that Tai Chi was capable of increasing lower extremity muscle strength and physical function among PN patients. Interestingly, Tai Chi training was able to increase the distance covered during the 6MW test, and to reduce the risk for loss of functional mobility (i.e., decreased 8-foot up-and-go time) among the participants.

ACKNOWLEDGEMENTS

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