The effect of a 12 week aerobic exercise program on functional and neuromotor performance in older adults

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Introduction
With increasing age there is a deterioration of physical and neuromotor performance which are associated with an increased number of falls and disability in older adults. A number of studies have reported favourable improvements in physical performance after various strength exercise programs (Kalapotharakos et al., 2004), whereas a few studies have examined the effect of aerobic exercise on physical and neuromotor performance in older adults (Hassmen et al., 1992; MacRae et al., 1996; Ettinger et al., 1997). The purpose of this study was to determine the effects of a 12 week progressively high aerobic exercise program on physical and neuromotor performance in inactive healthy older adults.

Methods
Twenty-two inactive healthy older adults voluntarily participated in the study and were assigned to an aerobic exercise group (AE, n=12), or to a control group (CON, n=10). Aerobic exercise group (AE) exercised three times per week for 12 weeks, on non consecutive days. Aerobic exercise consisted of walking on a treadmill. Exercise intensity and duration were progressively increased within a 12 wk period until the last week the experimental group exercised at 80% of maximal heart rate (Hrmax) for 40 minutes. Both groups were evaluated before and after the exercise period in the 1-Repetition Maximum (1-RM) of knee extensors and flexors, 6-minute walk distance (6-MWD), chair rising time (CRT), and whole body reaction time (WBRT).

Results
After the exercise period, AE improved significantly (p<0.05) the 1-RM knee extensors (12%) and flexors (19%) muscle strength, 6-MWD (17%), chair rising time (8%), and WBRT (Table 1).

Table1. Pre- and post- exercise values in 6-MWD, CRT and WBRT in the AE and CON groups (Means±SD)

<table>
<thead>
<tr>
<th>Measurements</th>
<th>AE (n = 12)</th>
<th>CON (n= 10)</th>
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<tbody>
<tr>
<td>Pre- Post- Pre- Post- 6-MWD (m)</td>
<td>473 ± 33.7 555 ± 48*</td>
<td>441 ± 48.4 445 ± 40</td>
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<tr>
<td>CRT (sec)</td>
<td>12.44 ± 1.82 11.55 ± 1.46*</td>
<td>11.82 ± 2.12 12.1 ± 1.72</td>
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<tr>
<td>WBRT (sec)</td>
<td>1.08 ± 0.29 0.88 ± 0.20*</td>
<td>1.07 ± 0.15 1.06 ± 0.17</td>
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</table>

*p < .05 significant differences between pre and post exercise values.

Discussion
The results of this study indicated that a 12 week aerobic exercise program improved the physical and neuromotor performance, as measured by 6 - minute walk distance, chair rising time and whole body reaction time, in healthy inactive older adults. Previous studies reported comparable results in 6-MWD and choice reaction tasks in using low aerobic, strength or a combination strength, aerobic, and flexibility exercise programs (Hassmen et al., 1992; Lord et al., 1995; Ettinger et al., 1997; Mador et al., 2004). These findings suggest that the participation in a progressively high aerobic exercise program may improve the mobility and ability to carry out activities of daily living, decrease the fall risk, and promote the quality of life of older adults.

References