Responses to Walking-Speed Instructions: Implications for Health Promotion for Older Adults

Claire F. Fitzsimons, Carolyn A. Greig, David H. Saunders, Susan J. Lewis, Susan D. Shenkin, Cynthia Lavery, and Archie Young

This study examined the effect of age on descriptive walking-speed instructions commonly used in health promotion. Participants were 9 young (20–23 years) and 9 older (75–83 years) women. Oxygen uptake and walking speed were measured in response to descriptive walking instructions (“slow,” “comfortable,” “brisk,” and “fast”). Although the older women walked ≈20% slower in response to all walking instructions and with significantly lower oxygen costs for brisk and fast, the intensity of the exercise represented a much greater percentage of VO$_{2_{\text{max}}}$ and showed greater interindividual variation. When asked to walk at a brisk pace, the older women averaged 67% VO$_{2_{\text{max}}}$ (SD 20.6), whereas the young women averaged only 45% VO$_{2_{\text{max}}}$ (SD 4.5). With older people, brisk might elicit an exercise intensity unnecessarily high for physiological benefit and that might compromise safety and adherence, which emphasizes the need for validation of carefully worded exercise and training guidance for older adults.

**Key Words:** oxygen consumption, self-paced walking, exercise intensity

Current health-promotion advice encourages adults of all ages to participate in regular moderate-intensity activity (U.S. Department Health and Human Services [USDHHS], 1996), for example, brisk walking (NHS Scotland, 2001; Pate et al., 1995). Authoritative national publications tend to define walking-speed descriptors (such as brisk) in terms of absolute walking speed, implying that older and young individuals might walk at the same absolute pace in response to the same descriptor. Furthermore, they have usually associated “brisk” walking with moderate-intensity activity, irrespective of age. For example, the English National Fitness Survey defined fast as ≥4 miles/hr and aligned both brisk and fast with a moderate energy cost, independent of age (Skelton, Young, Walker, & Hoinville, 1999). The Centers for Disease Control and the American College of Sports Medicine (ACSM) have

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also classified brisk walking as moderate-intensity exercise and equated it to a walking speed of 4 miles/hr (Pate et al., 1995). Aging, however, is accompanied by a decline in physical performance. Although this is acknowledged in the Surgeon General’s report (USDHHS, pp. 32–33), brisk is still equated with moderate exercise for all ages (p. 6), indicating a tacit assumption that the same instruction will elicit a similar relative effort in both old and young.

When older people are given a descriptive walking instruction, do they walk at the same absolute speed as younger people and so at a greater relative oxygen cost, as has been suggested by Morris and Hardman (1997)? Alternatively, do older people walk at a slower absolute speed (in response to the same instruction) than younger people do (Bassey, Fentem, MacDonald, Patrick, & Scriven, 1977), perhaps corresponding either to the same percentage of their maximal oxygen uptake (VO\textsubscript{2max}) or to the same percentage of their maximal walking speed?

The aim of this study was to examine the influence of age on the response to descriptive walking-speed instructions and, in particular, whether older volunteers responded by walking at the same absolute or relative levels of speed and oxygen uptake as young volunteers do. This type of information is essential for the correct implementation of training programs because it is not known whether the language used in current guidelines, based largely on guidelines devised originally for younger adults, will produce an effective but safe response from older adults.

The descriptive instructions examined in this study were selected because they not only are in common use but also might be interpreted as describing different aspects of walking (and might therefore be influenced by age in different ways). Fast and slow appear to describe speed, comfortable appears to describe an aspect of the perception of effort, and brisk arguably describes walking technique.

**Methods and Procedures**

All procedures were performed according to the Declaration of Helsinki and with approval from the local research-ethics committee. Informed written consent was obtained from the participants before the study began. Descriptive information on the study participants is provided in Table 1. Two of the investigators (C.A.G. and D.H.S.) are experienced exercise physiologists who between them have accumulated 35 years of experience in clinical exercise testing of young and older volunteers and patient groups. A specialist registrar in geriatric medicine (S.D.S.) provided medical supervision of the treadmill tests.

Sample size was calculated from the mean (and standard deviation) of the absolute walking speed measured previously in healthy older volunteers in our laboratory during comfortable self-paced walking. Eighteen volunteers (n = 9 in each group) were required to achieve 95% power to detect a difference of 20% in absolute walking speed (Machin, Campbell, Fayers, & Pinol, 1997). The young volunteers were recruited from local university undergraduates via a poster advertisement. The older volunteers were recruited from the local community in response to a newspaper advertisement, and all were living at home.
Volunteers involved in regular physical training were excluded from the study. Regular physical training was defined as any planned, structured, and repetitive bodily movement done to improve or maintain one or more component of physical fitness (USDHHS, 1996). Volunteers not meeting previously published criteria for “healthy” (Greig et al., 1994) were also excluded from the study, as were those who did not successfully complete a progressive treadmill walking test up to approximately 85% of predicted maximum heart rate. The volunteers were defined as healthy according to previously described exclusion criteria (Greig et al.) that were designed both for safety and to define freedom from diseases that might alter exercise performance:

- History of myocardial infarction within the previous 10 years
- Cardiac illness—for example, symptoms of aortic stenosis, acute pericarditis, acute myocarditis, aneurysm, severe angina, clinically significant valvular disease, uncontrolled dysrhythmia, claudication—within the previous 10 years
- Thrombophlebitis or pulmonary embolus within the previous 10 years
- History of cerebrovascular disease
- Acute febrile illness within the previous 6 months
- Moderate or severe airflow obstruction
- Metabolic disease (e.g., diabetes, thyroid disease), whether controlled or uncontrolled
- Major systemic disease diagnosed or active within the previous 20 years (e.g., cancer, rheumatoid arthritis)
- Significant emotional distress, psychotic illness, or anything worse than mild anxiety or depression within the previous 10 years
- Osteoarthritis, classified by inability to perform maximal contractions of upper and lower limbs without pain

### Table 1  Participant Characteristics, $M (SD)$

<table>
<thead>
<tr>
<th></th>
<th>Young</th>
<th>Elderly</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$n$</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Age, years</td>
<td>21.1 (0.93)</td>
<td>78.2 (2.44)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Height, m</td>
<td>1.72 (0.05)</td>
<td>1.58 (0.05)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Body mass, kg</td>
<td>64.48 (7.57)</td>
<td>54.69 (6.09)</td>
<td>.008</td>
</tr>
<tr>
<td>Years of education</td>
<td>17.8 (0.44)</td>
<td>11.2 (2.48)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Physical activity levels, $n$ volunteers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>walk 0.5 mile 3–4 times/wk</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>walk 1 mile 3–4 times/wk</td>
<td>8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>flights of stairs/day, median (range)</td>
<td>10.0 (2–15)</td>
<td>2.0 (0–12)</td>
<td>.04</td>
</tr>
</tbody>
</table>
• Bone fracture sustained within the previous 2 years
• “Old person’s fracture” after 40 years of age (wrist, hip, vertebral)
• Nonarthroscopic joint surgery, ever, in the relevant limb part (i.e., hip, knee, ankle)
• Any reason for a loss of mobility for more than 1 week in the previous 6 months or more than 2 weeks in the previous year
• On daily medication (including daily simple analgesia), on estrogen-replacement therapy, on medication for hypertension, or with a diuretic for any other reason, even if not daily
• Obese—Quetelet index (weight/height$^2$) > 29.9
• Resting systolic blood pressure > 200 mmHg or resting diastolic blood pressure > 100 mmHg

The participants of this study were all free from prescription medications, recent diagnoses, and additional health characteristics that would have contravened these criteria.

On the first visit, the nature of the study was described, but a detailed explanation of study objectives was avoided. Volunteers performed a progressive treadmill walking test up to 85% of predicted maximum heart rate. This served as both health screen and familiarization. The exercise test protocol (Greig et al., 1994) was based on the Naughton protocol (ACSM, 2000, p. 97) for the older volunteers, and a modified Bruce protocol (Jones, 1988) was used for the young volunteers. A modified Naughton protocol was used when testing the older volunteers because of the assumption that the large increments in exercise intensity between stages in the Bruce protocol might result in their inability to achieve a true maximal oxygen uptake (ACSM, p. 97). Blood pressure was measured before and at 3-min intervals during exercise. Electrocardiograph was monitored before exercise, continuously throughout exercise, and for 5–10 min postexercise.

During the second and third visits to our laboratory, the volunteers performed the same progressive exercise protocol but continued for as long as possible. Ventilation and gas exchange were measured using a Metamax® 3B ambulatory metabolic-measurement system (CORTEX Biophysik, Leipzig, Germany; Schulz, Helle, & Heel, 1997). Ventilatory rate and fractional concentrations of oxygen and carbon dioxide were measured on a breath-by-breath basis via a facemask. A test was defined as maximal on the investigators’ subjective assessment that the individual could not continue, along with a respiratory-exchange ratio of $\geq 1.00$ (older volunteers; Cunningham, Paterson, Koval, & St. Croix, 1997; Malbut, Dinan, & Young, 2002) or $\geq 1.10$ (young volunteers; Zhou et al., 2001). $V_{O2}$max values were calculated from the average of the final 15 s of exercise in the presence of these criteria. The highest value of $V_{O2}$ achieved in the presence of these criteria on either the second or third visit was taken as $V_{O2}$max.

The fourth visit involved self-paced walking in response to specific walking instructions while wearing the Metamax system. The volunteers were given standardized walking instructions to read. They were asked to walk 150 m around an indoor 50-m oval circuit (synthetic sports floor) in response to walking instructions
that included the descriptors slow, fast, comfortable, or brisk. Each volunteer walked unaccompanied, twice at each pace. The volunteers were randomized to either Series 1 or Series 2:

Series 1: Slow, slow, fast, fast (10-min rest), comfortable, comfortable, brisk, brisk

Series 2: Comfortable, comfortable, brisk, brisk (10-min rest), slow, slow, fast, fast

The order of the walking descriptors was selected so that the second pair of descriptors was likely to result in a faster walking speed than the first, and likewise the fourth pair faster than the third. The volunteers rested for 3 min between walks. The rest period was extended to 10 min between Walks 4 and 5 (and returned to 3 min between Walks 5 and 8). This was to reduce the effects of fatigue from what might be expected to be a preceding harder work rate.

Heart rate was measured by telemetry before and after each walk (Polar A3™, Polar Electro, Kempele, Finland) to ensure a return to preexercise levels before the next walk. No feedback regarding walking performance was provided to volunteers during this visit. No significant difference was observed between pairs of walks: repeated-measures (RM) ANOVA within-participant factors walking instruction (slow, comfortable, brisk, and fast) and attempt at walking instruction (one or two) and between-participants factor of age group (young or old)—absolute walking speed, $F(1, 15) = 1.15, p = .301$; relative walking speed, $F(1, 16) = 1.01, p = .329$; absolute oxygen cost, $F(1,15) = 2.95, p = .106$; relative oxygen cost, $F(1, 10) = 0.67, p = .432$. The mean values of oxygen uptake and walking speed obtained from the two attempts at each walking instruction were used in subsequent analyses.

Maximal walking speed was measured over the central 10 m of a straight 14-m course in response to a specific instruction asking the volunteer to walk at her maximum speed at the end of Visit 4. Maximal walking speed was measured twice, and the highest value was used in subsequent analysis. Test sessions were separated by at least 24 hr.

An age-related reduction in β-adrenergic sensitivity means that even healthy older individuals have a “blunted” cardiac chronotropic response to exercise (Evans, Williams, Beattie, Michel, & Wilcock, 2000). Consequently, a comparison of old versus young heart rate is very difficult to interpret. In this study, heart rate was neither recorded nor analyzed during walking but was simply used as an indicator of recovery from a preceding walk.

All statistical analyses were carried out using SPSS® version 11. Levels of statistical significance for all tests were set at $p < .05$. A hierarchy of walking-speed responses elicited by the four instructions was not assumed a priori, but the existence of such a hierarchy was evident in the data. A $2 \times 4$ (Group × Walking Speed) mixed-model RM ANOVA was conducted. Absolute and relative walking speed were transformed on a log scale because the Mauchly’s tests of sphericity were significant—there was a large difference in standard deviations between the old and young groups. The Greenhouse Geisser test was used in the RM ANOVA...
when absolute and relative walking speeds were considered, because it does not assume sphericity of the data. The possibility of an interaction between speed and group was also examined using RM ANOVA. If a significant effect of age (between-participants factor) was apparent after RM ANOVA, Student’s independent $t$ tests were used to examine the effect of age on each individual walking instruction.

**Results**

During the treadmill walking tests on the second and third visits, 6 of the 9 young volunteers and 7 of the 9 older volunteers achieved VO$_{2\text{max}}$ in accordance with the criteria used. Those who did not were excluded from the analysis of relative oxygen cost ($\%$ VO$_{2\text{max}}$). VO$_{2\text{max}}$ (ml · min$^{-1}$ · kg$^{-1}$) was significantly higher ($p < .001$) for the young volunteers, with a mean value of 38.4 ($SD$ 2.2), than for the older volunteers, with a mean value of 20.4 ($SD$ 4.4; $n = 6$ young, $n = 7$ old).

The maximal walking speed of the young volunteers was significantly faster ($p < .001$) than that of the older volunteers, with a mean value of 2.6 m/s (0.3) compared with the old volunteers’ mean value of 1.9 m/s ($SD$ 0.2).

The older volunteers walked approximately 20% slower than the young volunteers in response to each instruction (Table 2). RM ANOVA (Greenhouse Geisser test) revealed a significant difference in absolute walking speed among the four walking instructions, $F(1.2, 19.4) = 133.6, p < .001$, along with a significant effect of age, $F(1,16) = 14.3, p = .002$ (Figure 1). There was no significant interaction between speed and group, $F(1.2, 19.4) = 0.8, p = .41$. Individual analysis (Student’s independent $t$ tests) revealed that the older volunteers walked significantly more slowly in response to each of the four walking instructions ($p$ values are presented in Table 2).

**Table 2  Walking Speed and Oxygen Cost Corresponding to Each Walking Instruction for Young and Elderly Volunteers, $M \ (SD)$**

<table>
<thead>
<tr>
<th>Walking speed (m/s)</th>
<th>Young $\ M \ (SD)\ $</th>
<th>Elderly $\ M \ (SD)\ $</th>
<th>Elderly/ Young</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>slow</td>
<td>1.01 (0.16)</td>
<td>0.79 (0.20)</td>
<td>78%</td>
<td>.018</td>
</tr>
<tr>
<td>comfortable</td>
<td>1.37 (0.10)</td>
<td>1.15 (0.16)</td>
<td>84%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>brisk</td>
<td>1.68 (0.11)</td>
<td>1.37 (0.16)</td>
<td>82%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>fast</td>
<td>1.75 (0.10)</td>
<td>1.42 (0.17)</td>
<td>81%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>VO$_{2}$ (ml · min$^{-1}$ · kg$^{-1}$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slow</td>
<td>9.86 (1.54)</td>
<td>9.14 (2.40)</td>
<td>93%</td>
<td>.460</td>
</tr>
<tr>
<td>comfortable</td>
<td>12.71 (1.06)</td>
<td>11.39 (2.66)</td>
<td>90%</td>
<td>.183</td>
</tr>
<tr>
<td>brisk</td>
<td>17.48 (2.41)</td>
<td>13.60 (2.94)</td>
<td>78%</td>
<td>.008</td>
</tr>
<tr>
<td>fast</td>
<td>19.12 (3.47)</td>
<td>15.07 (2.54)</td>
<td>79%</td>
<td>.012</td>
</tr>
</tbody>
</table>

*Note. $p$ values were generated using independent Student $t$ tests to compare old and young participants’ responses to each descriptive walking instruction.*
Similarly, RM ANOVA showed a significant difference in absolute oxygen cost among the four walking instructions, $F(3, 48) = 112.6, p < .001$, along with a significant age effect, $F(1, 16) = 5.9, p = .03$. There was also a significant interaction between speed and group with respect to absolute oxygen cost, $F(3, 48) = 7.1, p < .001$. Figure 2 depicts the absolute oxygen cost in response to the four walking instructions and shows that the effect of age was most marked for the “brisk” and “fast” instructions. Individual instruction analysis revealed that in response to the “brisk” and “fast” instructions, oxygen consumption for the older adult volunteers was significantly lower (Table 2). In response to the “slow” and “comfortable” instructions, however, the reduction in oxygen consumption was less noticeable and was not statistically significant.

When walking speed was expressed as a percentage of maximal walking speed, a significant difference among the four instructions was apparent, RM ANOVA (Greenhouse Geisser test) $F(1.4, 22.2) = 128.0, p < .001$, but the effect of age was nonsignificant, RM ANOVA $F(1, 16) = 1.5, p = .2$. There was no significant interaction with respect to speed and group, $F(1.4, 22.3) = 0.6, p = .51$.

Despite this, older volunteers used a higher percentage of their VO$_{2\text{max}}$ than the younger volunteers in response to each of the four instructions, RM ANOVA $F(1,11) = 12.0, p = .005$. They also showed much greater interindividual variation (Figure 3). For example, in response to the “brisk” instruction the range of values for the young volunteers was 38–49% VO$_{2\text{max}}$ and the range for the older volunteers...
Figure 2. Absolute oxygen cost for each walking instruction for young (▲) and elderly (♦) volunteers (lines represent mean values).

Figure 3. \( \text{VO}_2 \) for each walking instruction expressed as a percentage of \( \text{VO}_{2\text{max}} \) for young (▲) and elderly (♦) volunteers (lines represent mean values).
Table 3  Percentage of Maximum Walking Speed and Percentage of VO$_{2\text{max}}$ Corresponding to Each Walking Instruction for Young and Elderly Volunteers, $M$ (SD)

<table>
<thead>
<tr>
<th></th>
<th>Young</th>
<th>Elderly</th>
<th>Elderly/Young</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Maximum walking speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slow</td>
<td>39.8 (6.4)</td>
<td>40.1 (7.2)</td>
<td>101%</td>
<td></td>
</tr>
<tr>
<td>comfortable</td>
<td>53.9 (6.3)</td>
<td>59.0 (6.2)</td>
<td>109%</td>
<td></td>
</tr>
<tr>
<td>brisk</td>
<td>66.3 (6.8)</td>
<td>70.5 (8.0)</td>
<td>106%</td>
<td></td>
</tr>
<tr>
<td>fast</td>
<td>68.7 (5.0)</td>
<td>73.1 (9.3)</td>
<td>106%</td>
<td></td>
</tr>
<tr>
<td>% VO$_{2\text{max}}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slow</td>
<td>24.2 (3.4)</td>
<td>46.8 (15.3)</td>
<td>193%</td>
<td>.005</td>
</tr>
<tr>
<td>comfortable</td>
<td>32.6 (3.5)</td>
<td>55.8 (14.1)</td>
<td>171%</td>
<td>.002</td>
</tr>
<tr>
<td>brisk</td>
<td>45.1 (4.5)</td>
<td>67.2 (20.6)</td>
<td>149%</td>
<td>.026</td>
</tr>
<tr>
<td>fast</td>
<td>46.9 (4.8)</td>
<td>77.6 (21.2)</td>
<td>165%</td>
<td>.006</td>
</tr>
</tbody>
</table>

Note. $p$ values were generated using independent Student $t$ tests to compare old and young participants’ responses to each descriptive walking instruction. No significant age effect was achieved on analysis of relative walking speed (RM ANOVA), and therefore no post hoc analysis of individual instructions has been included for this variable.

was 43–99% VO$_{2\text{max}}$. The relative oxygen cost in response to each instruction was sufficiently different to achieve statistical significance, RM ANOVA $F(3, 33) = 63.9$, $p < .001$. There was no significant interaction with respect to speed and group, $F(3, 33) = 1.8$, $p = .16$. Individual instruction analysis showed that the older volunteers incurred a significantly higher relative oxygen cost for each of the four walking instructions (Student’s independent $t$ tests; Table 3).

Discussion

This study examined the influence of age on the response to descriptive walking-speed instructions. The decline in absolute walking speed with increasing age in response to a specific walking instruction has previously been documented (Bassey et al., 1977; Himann, Cunningham, Rechnitzer, & Paterson, 1988). In response to “slow,” “normal,” and “fast” walking instructions, Himann et al. observed that older individuals (63 years and older) walked at significantly slower speeds for all instructions than did younger groups (19–39 and 40–62 years). Bassey et al. reported a significant reduction in walking speed in response to the walking instructions “slow,” “normal,” and “fast” in individuals both 1 and 2 years after retirement. The decline in absolute walking speed is confirmed in the present study. In addition, this study shows that the elderly volunteers chose to walk at the same percentage of maximal walking speed as the young volunteers. This suggests that the perception
of relative walking speed might be the basis on which the responses to descriptive walking instructions are determined, irrespective of whether the instructions appear to relate to speed (fast, slow), effort (comfortable), or technique (brisk).

In order to maintain a similar percentage of maximal walking speed, the aerobic cost expressed as a percentage of VO$_{2\max}$ was significantly higher (and showed greater interindividual variation) for the older women. On average, the older volunteers walking at their slow pace experienced the same relative aerobic demand as the young volunteers walking at their fast pace (47% of VO$_{2\max}$).

The relative aerobic cost of walking does not appear to be a controlling factor in the response to walking instructions. Potential differences in the anaerobic contribution to the energy cost of walking might be important. Blood-lactate kinetics before and during exercise change with age, resulting in the lactate threshold occurring at a higher percentage of VO$_{2\max}$ (Iredale & Nimmo, 1997). This might explain why the older volunteers were able to choose to walk at a significantly higher percentage of VO$_{2\max}$.

Brisk walking is one of the recommended forms of exercise to accomplish the ACSM’s recommendation to accumulate at least 30 min of moderate-intensity exercise (40–60% of VO$_{2\max}$; ACSM, 2000, pp. 27, 226). In response to the “brisk” instruction, however, the older volunteers walked at 67% (mean value) of their VO$_{2\max}$ (Table 3). This is above the ACSM’s recommended upper limit of exercise intensity for older adults and might unnecessarily increase their risk of cardiovascular and orthopedic injury (ACSM, p. 226). Furthermore, the range of relative oxygen-cost values was significantly higher for the older volunteers (Figure 3), highlighting the unpredictability of the relative intensity of older individuals’ response.

In older adults, brisk might elicit an exercise intensity that is unnecessarily high for physiological benefit and that might compromise safety and adherence, which suggests the need for validation of carefully worded exercise and training guidance for older adults.

The findings of this study might not be applicable to all older adults. The members of our older group were selected on the basis of their freedom from medication and from diagnosed or symptomatic disease (Greig et al., 1994). This increased their comparability with the younger group but reduced their comparability with their contemporaries. Furthermore, there might be cultural differences in the interpretation of the walking instructions between our study groups and women in other English-speaking nations and between women with different levels of education. Indeed, this might have contributed to the differences between the two groups of women in the present study. It should be possible to enhance the generalizability of the findings of this study by making a comparison with other studies measuring the physiological response of humans to walking-speed descriptors.

Himann et al. (1988) compared a group of younger women (mean age 29 years) with a group of older women (age 63 years and over, $M$ 77.5 years). In response to both “slow” and “fast” instructions, both of Himann’s groups walked more slowly than our groups. Moreover, the older women walked at 72% of the
younger women’s speed, whereas our older woman walked at about 80% of our younger women’s walking speed. One reason for this might be the excellent health enjoyed by our elderly volunteers. Unfortunately, Himann presented no information on participants’ rates of oxygen consumption or maximal walking speeds. Danneskiold-Samsoe et al. (1984) reported a “usual” walking speed of 0.9 m/s for 29 women age 78–81 but again provided no information on rates of oxygen consumption or maximal walking speeds. Parise, Sternfeld, Samuels, and Tager (2004) measured the “normal brisk” walking speed of 117 women of mean age 70 years. Their average walking speed was 1.54 m/s over a half-mile course, somewhat faster than the “brisk” walking speed of our older women (1.37 m/s) and slower than that of our young women (1.68 m/s). Although Parise reported her participants’ mean peak oxygen consumption, their rates of oxygen consumption during “normal brisk” walking were not measured, and neither were their maximal walking speeds. There is very little evidence relating to relative walking speed and oxygen cost in individuals similar in age to the volunteers in this study. Lindquist, Aniansson, and Rundgren (1983) reported that older women in Sweden (mean age 70 years) chose to walk at 78% of their maximal walking speed in response to the instruction to walk at a comfortable pace.

This study has illustrated the potential importance of careful wording of exercise guidance for elderly people. With older adults, brisk might elicit an exercise intensity that is unnecessarily high for physiological benefit and that might compromise safety and adherence; this emphasizes the need for validation of carefully worded exercise and training guidance for older adults.

Acknowledgments

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References


