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Improvements in Functional Capacity From Nordic Walking: A Randomized Controlled Trial Among Older Adults

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This study examined the effects of an instructed structured Nordic walking (NW) exercise program on the functional capacity of older sedentary people. Volunteers were randomly assigned to an NW group (68.2 ± 3.8 yr old) or control group (69.9 ± 3.0 yr old). Before and at the end of the 9-wk intervention, functional tests and 2-dimensional ground-reaction-force (GRF) patterns of normal (1.40 m/s) and fast (1.94 m/s) walking speeds were measured. The intervention included a 60-min supervised NW session on an inside track twice a week for 9 wk. The mean changes in functional tests differed between groups significantly. Gait analyses showed no significant differences between the groups on any GRF parameters for walking speed either before or after the intervention. The study showed that NW has favorable effects on functional capacity in older people and is a suitable form of exercise for them.

Keywords: elderly people, gait analysis, functional test, exercise program

With increasing age, functional capacity decreases, and elderly people become more cautious about moving around. Difficulties in balance and mobility and limitations in musculoskeletal strength, range of motion, and flexibility are fairly common among older people (Hickey et al., 1996). These factors together reduce walking speed and step length and can make walking unsteady and even clumsy. Thus, Nordic walking poles might be useful equipment for supporting older adults' walking exercise.

Nordic walking is a relatively new form of exercise that has gained a lot of interest among middle-aged and elderly people, especially in Finland. So far, most studies concerning the effects of pole walking have focused on physiological responses, showing higher heart rate and oxygen consumption (VO_2; Porcari, Henrickson, Walter, Terry, & Walsko, 1997; Schiffer et al., 2006) and energy cost (Butts, Knox, & Foley, 1995; Hansen & Smith 2009; Rodgers, Vanheest, & Schachter, 1995; Saunders, Hipp, Wenos, & Deaton, 2008; Walter, Porcari, Brice, & Terry, 1996) than walking without poles. Previous studies mostly focused on young and middle-aged people, except for those studying the effects of Nordic

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walking on certain health conditions. Positive effects of Nordic walking have been found among those who suffer from Sjögren's syndrome (Strömbeck, Theander, & Jacobsson, 2007), intermittent claudication (Oakley, Zwierska, Tew, Beard, & Saxton, 2008), and Parkinson's disease (van Eijkeren et al., 2008). Recently, Fregly, D'Lima, and Colwell (2009) showed that walking poles can offer a gait modification for offloading the medial compartment of the knee in those suffering from knee osteoarthritis. However, this reduction was not observed by Jensen et al. (2010) in healthy young people.

Previous studies have shown that Nordic walking is an appropriate exercise method for older people (Kukkonen-Harjula et al. 2007) and has favorable cardiorespiratory effects (Church, Earnest, & Morss, 2002; Porcari et al., 1997). However, information about the effects of Nordic walking on older people's functioning in everyday life is still lacking. The first purpose of this study was to examine the usability of a structured 9-week Nordic walking exercise program and its benefits on certain functions important in everyday life among older sedentary people. Because walking is important in most activities of daily living and facilitates many social activities, gait analysis is commonly used as a measure of fitness for activities of daily living. An unsteady gait increases the fear of falling (Maki, 1997) and may even lead to a decrease in physical activity. Therefore, our second purpose was to determine the effects of Nordic walking on participants' gait. Such knowledge may be used to improve and prolong the quality of older people's life. Our hypotheses were that a 9-week Nordic walking exercise program would increase functional capacity and improve walking balance in the elderly.

Methods

Participants and Study Setting

Subjects were solicited for this study in the local newspaper, in which Nordic walking and the study were introduced. Inclusion criteria for participation were female or male gender, age 65 or older, and no participation in any regular physical activity exercise (sedentary). The exclusion criterion was any disease manifestation known to prevent or limit exercise performance. Forty volunteers (34 women and 6 men) fulfilled the criteria and were randomly allocated to Nordic walking (n = 13, 10 women and 3 men), regular walking (n = 13, 11 women and 2 men), and control groups (n = 14, 13 women and 1 man). Group assignments were sealed in 40 envelopes and after baseline measurements were drawn at random, given to participants, and opened and recoded. A blinded research assistant was not available to measure functional capacity, so to ensure proper measurement, the researchers executed the measures themselves. However, blinding was used in respect to gait analysis, the measurer not being aware of participants' groups at either pre- or posttest. Before the intervention began 1 person from the Nordic walking group dropped out because of difficulties in committing to the time-consuming program. One person in the walking group had an unexpected surgery and 1 dropped out for personal reasons. After we reconsidered the number of participants in the different groups and the possibility of more dropouts during the intervention, we merged the Nordic walking and walking groups. The final groups consisted of 23 people (18 women and 5 men) in the intervention and 14 (13 women and 1 man) in the control group. The mean ages of participants were 68.2 (*SD* 3.8) in the intervention group and 69.9 (*SD* 3.0) in the control group. The ethics committee of the university approved the study procedures. The study was a controlled intervention trial. The study plan was explained, and written informed consent was obtained, before data collection. The flow of participants through the trial is shown in Figure 1, and background information about the participants, in Table 1. There were no significant differences between the Nordic walking and control groups in background variables at baseline.

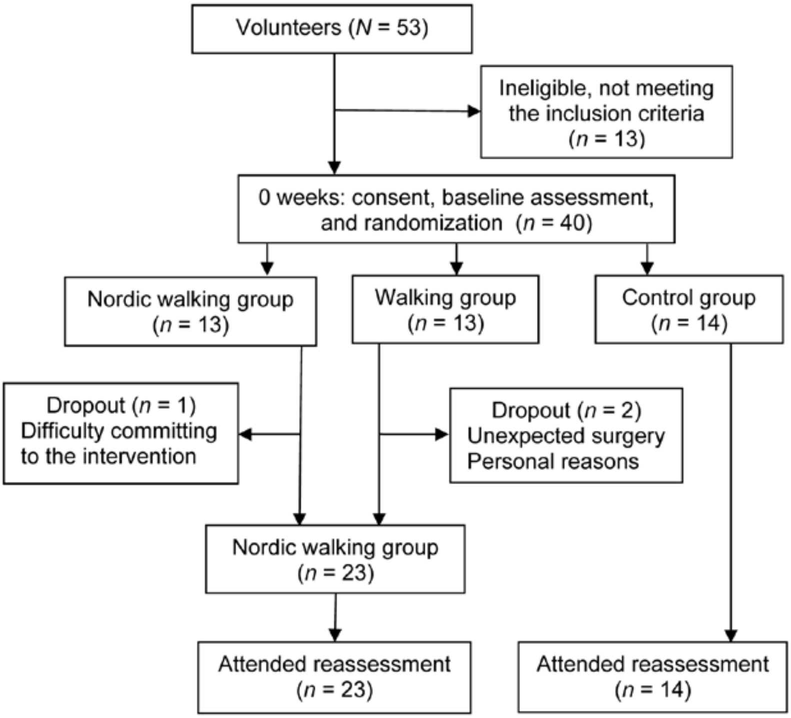

Figure 1 — Flow of participants through the trial.

Table 1 Background Information of the Participants at Baseline, *M* (*SD*)

Variable	Nordic walking group (*n* = 23)	Control group (*n* = 14)	*t*	*df*	*p*
Age, years	68.2 (3.8)	69.9 (3.0)	–1.47	35	.151
Height, cm	163.0 (8.0)	163.3 (5.8)	0.31	35	.756
Weight, kg	73.1 (12.0)	71.5 (11.4)	0.65	35	.523
Body-mass index	27.5 (4.0)	26.8 (4.3)	0.51	35	.616

Measures

Health and Physical Activity Assessment. Volunteers were required to have a medical checkup before they were accepted into the study. Before the baseline tests they were interviewed using a standardized questionnaire, which was filled in by the researcher. The questionnaire included questions to ensure the adequacy of the participants in the exercise intervention. They consisted of questions relating to health status (chronic diseases, medication, and history of cardiovascular diseases in the family), physical activity during the past 3 months (frequency per week and duration per session), self-rated muscle fitness, and endurance fitness in comparison with age peers. The questionnaire was based on inquiries tested and used in previous studies (Heikkinen, 1997; Parkatti, 1990). In addition to required medical checkup, these data were used to choose participants for the study. In a verbal debriefing after the follow-up test, the participants were asked to comment on their experiences in the Nordic walking exercise program. Debriefing was based on structured questions concerning participants' perception of the change (increased, not changed, decreased) in their overall health status, functional capacity, physical fitness, and mental well-being. In addition, they were asked if they had anything else to comment on about the intervention.

Physical Function. Before and at the end of the 9-week intervention, functional capacity was measured using the functional-assessment battery developed by Rikli and Jones (2001). This test battery was developed to measure older people's functional capacity, and it is a widely used and valid measure for this age group (Rikli & Jones, 2001). The tests measure the physical attributes needed to perform activities of daily living. They are safe for older adults and meet scientific standards for reliability and validity. The test battery included a chair-stand test to assess lower extremity strength, arm-curl test of upper extremity strength, chair sit-and-reach for lower body flexibility, back-scratch test for upper body flexibility, 2-min step-in-place test to assess aerobic endurance, and 8-ft up-and-go test to assess agility/dynamic balance. The chair-stand test involved counting the number of times in 30 s that a person could come to a full stand from a seated position with arms folded across the chest. The arm-curl test involved counting the number of times a person was able to curl a hand weight, 2 kg for women and 4 kg for men, through the full range of motion in 30 s. The chair sit-and-reach test involved sitting at the front edge of a stable chair with one leg extended (a splint was used to standardize the angle of the ankle) and the other foot flat on the floor. With hands on top of each other and arms outstretched, the object was to reach as far forward as possible toward the toes. The score is the number of centimeters, either plus or minus, between the tips of the middle fingers and the toes. The back-scratch test involved reaching one hand over the shoulder and down the back as far as possible and the other hand around the waist and up the middle of the back as far as possible, trying to bring the fingers of both hands together. The score is the number of centimeters, either plus or minus, between the extended middle fingers. The 2-min step test involved determining the number of times in 2 min that the person was able to step in place, raising the knees to a height halfway between the patella and iliac crest. The 8-ft up-and-go test involved getting up from a seated position and walking as quickly as possible around a cone 8 ft (2.44 m) away and returning to the seated position. The score is the time in seconds.

At the baseline measures of functional fitness, body height was measured in centimeters with a fitted meter stick, and body weight in kilograms with a digital scale. Participants wore no shoes and the same clothes for these measures before and after the intervention. The participants scored below the normative values for their age group in the United States.

Gait Analysis. Judged by clinical observation, all the subjects walked normally. They did the walking trials on a 30-m-long walkway (covered with Tartan mat) to become familiar with the experimental procedure. The force platform (10-m long, Raute Oy, Finland; natural frequency ≥150 Hz, linearity ≤1%, crosstalk ≤2%) was mounted in the middle of the walkway in two rows. Each force platform row collects data only from its own side. This method allows ground-reaction forces (GRF) to be collected from both feet simultaneously during many consecutive steps. The measuring procedure used in the current study has been described in more detail previously (Perttunen & Komi, 2001).

Walking speed was measured and controlled by photocells (Newtest, Oulu, Finland). The measurements were performed immediately after familiarization, and the subjects were examined at target velocities of 4.0 (normal) and 7.0 km/hr (fast), corresponding to 1.40 and 1.94 m/s, respectively. The criterion for the normal walking speed was the margin within 2.5% of the selected speed. All the subjects walked twice at each speed. In each trial at least seven contacts of each foot were collected. Every subject wore the same type of athletic running shoes during testing to minimize any possible effects of shoes on performance.

Maximal and average GRFs and their directions were analyzed. All recorded and calculated signals were averaged intraindividually for both walking speeds. Contact times were divided into the braking and push-off phases according to the direction of the anteroposterior horizontal force (Mero & Komi, 1986). A vertical force signal of 20 N was used to identify and trigger the beginning and the end of contact.

Intervention

Before the intervention a certified Nordic walking trainer taught the Nordic walking technique to the participants following the guidelines of the International Nordic Walking Federation (http://inwa-nordicwalking.com). The intervention included a 60-min standard Nordic walking instructed exercise session twice a week for 9 weeks on an inside track. We chose a 9-week program because according to the literature (e.g., Damush & Damush, 1999; Hung et al., 2004; Schlicht, Camaione, & Owen, 2001) an 8-week program is sufficient to result in physical changes (e.g., increase muscle force), so a 9-week Nordic walking exercise program would fulfill these requirements. Each session included a 5-min warm-up period of stretching and slow walking followed by 40 min of Nordic walking with a 10-min stretching period in the middle. Each session ended with a 5-min cooldown period of slow walking and stretching. During the training participants were instructed to walk as fast as was comfortable. Training intensity was based on subjective perception of exertion, and heart rate was monitored by a Polar transmitter belt (Polar Ltd., Kempele, Finland) during the first exercise session. Based on these heart-rate measures the participants were advised by the instructor to check their heart rate manually during the exercise session. The intensity target was 60% of the age-predicted maximal heart rate. Warm-up and cooldown exercises included walking at low speed and stretching exercises with the poles that targeted both upper and lower body. Stretching with poles in different bouts of exercise included varying heel and toe raise, hip and knee flexion, front and back minilunge, squat kayak forward and backward, triceps extension, open chest, back flexion, step squat, push-up, straight back squat, and forward flex.

Adherence to Program

Participants in both groups were encouraged to continue their routine activities during the 9-week intervention period but were asked not to take part in any new, additional exercise. The importance of adherence was discussed with all participants at the baseline evaluation. Throughout the 9-week intervention period participation and session attendance in the intervention group were tracked by the instructor. In the control group, adherence to instructions given at baseline was checked in debriefing in the follow-up measures.

Statistical Methods

Because of the small number of male participants, data were analyzed in one group. Mean and standard deviation were calculated by condition. The differences in mean changes of the six functional tests between the intervention group and control group were compared using multivariate analysis of variance. The mean changes in the functional tests were studied separately in test and control groups using a matched-pairs *t* test. Effects were evaluated on an intention-to-treat basis. In three different test variables, for 4 different participants, altogether only five missing values occurred. The values were missing completely at random (Little's MCAR test: $\chi^2(91) = 95.9$, $p = .343$). The missing data were imputed using the EM method (PASW 18). All statistical analyses were performed with a statistical software package (PASW, version 18.0).

Results

All 23 participants in the intervention group completed the 9-week training period. The mean percentage of sessions attended by participants was 86%. The significance for each functional test is shown in Table 2. In the Nordic walking group test scores were statistically significantly better after the intervention on all except the back-scratch test. In the Nordic walking group the results showed improvement of 15.3% in chair-stand test, 19.7% in arm curls, 14.0% in 2-min step test, 92.5% in sit-and-reach test, 17.3% in back scratch, and 10.0% in up-and-go test. In the control group, improvement, though not statistically significant, was found in chair-stand test (2.2%), arm curls (1.9%), 2-min step test (2.8%), and chair sit-and-reach test (2.9%). On the back-scratch test, the decrease was 23.1%, which was statistically significant. For the up-and-go test no change was observed in the control group. There were differences, though not statistically significant, between the groups at baseline, which were taken into account by analyzing the mean changes of the test scores. The mean changes differed between the groups significantly; the multivariate test yields $F(6, 30) = 9.0$, $p < .001$. Means of standardized changes for the six functional tests are presented in Figure 2.

Table 2 Pre- and Posttest Measures for the Six Functional Tests

Test	Nordic Walking Group (n = 23)				Control Group (n = 14)						
	Before	After	t test[a] (df = 22)		Before	After	t test[a] (df = 13)		t test[b] (df = 35)		
	M (SD)	M (SD)	t	p	M (SD)	M (SD)	t	p	t	p	Observed power
Chair stand, times/30 s	12.4 (2.1)	14.3 (2.0)	–6.44	.000	13.6 (2.6)	13.9 (2.6)	–0.81	.435	3.42	.002	.913
Arm curls, times/30 s	14.2 (3.6)	17.0 (2.5)	–6.39	.000	15.7 (3.6)	16.0 (3.3)	–0.50	.624	3.50	.001	.926
Step, steps/2 min	88.3 (19.4)	100.8 (8.9)	–3.85	.001	94.3 (18.7)	95.0 (16.5)	–0.30	.770	2.62	.013	.720
Sit-and-reach, cm	5.3 (11.4)	10.2 (8.9)	–3.90	.001	10.3 (14.1)	10.6 (14.4)	–0.33	.746	2.64	.012	.726
Back scratch, cm	–6.3 (8.7)	–5.2 (8.3)	–1.98	.061	–1.3 (8.7)	–2.4 (9.6)	1.99	.068	2.65	.012	.731
Up-and-go, s	6.1 (1.0)	5.5 (0.9)	9.66	.000	5.6 (0.6)	5.6 (0.6)	0.04	.966	–5.85	.000	1.000

[a]Paired-samples t test. [b]Independent-samples t test.

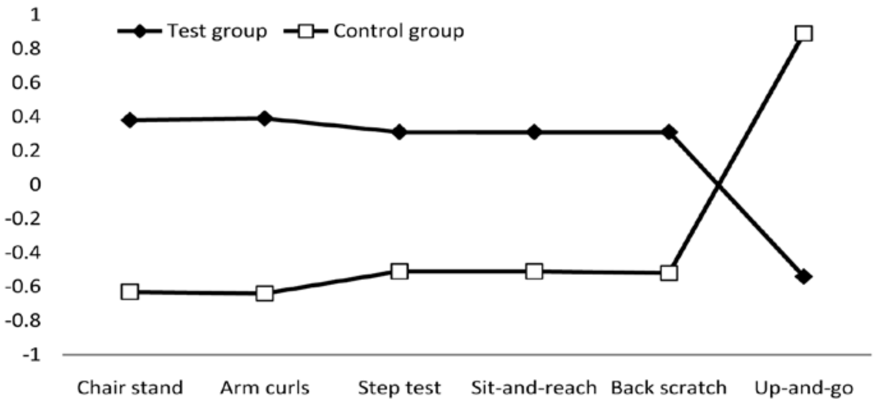

Figure 2 — Means of standardized changes (difference between post- and pretest) for the six functional tests in Nordic walking and control groups. In the up-and-go test, a negative value means a better test result.

Verbal debriefing after the intervention revealed that participants in the Nordic walking group had experienced positive change in their overall health status (30.4%), functional capacity (56.5%), physical fitness (56.5%), and mental well-being (87.0%). The percentages of those for whom Nordic walking had benefitted the change were 34.8% in health status, 47.8% in functional capacity, 60.9% in physical fitness, and 78.3% in mental well-being. In the control group, decreases (2 persons in health status, 1 in functional capacity, and 1 in physical fitness) or no change was observed in these variables. The Nordic walking group also perceived that the program had contributed positively to their everyday life, as in increased endurance while doing heavy cleaning.

The temporal parameters of the gait cycle and the vertical and horizontal GRFs depended on walking speed, as shown in Table 3. Bilateral comparison between left and right feet showed that the foot-loading patterns in both groups were symmetrical before and after the intervention. No statistically significant differences were found between legs in any of the vertical and horizontal GRFs in the braking and push-off phases at the selected walking speeds. As expected, the temporal and GRF parameters of the gait cycle changed when walking speed increased, but the asymmetry did not become greater with increasing walking speed. Interindividual variability was much greater than that in intraindividual comparison.

Furthermore, no statistically significant differences between the Nordic walking group and control group were found in any temporal and GRF parameters at either walking speed before or after the 9-week intervention. To test step-to-step variability during gait before and after the intervention, the coefficient of variation was also calculated. The coefficient of variation showed no statistically significant differences in the gait parameters between the Nordic walking group and the control group.

Table 3 Differences in Parameters Between Limbs in the Nordic Walking (NW) Group and Control Group at the Normal and Fast Walking Speeds, *M* ± *SD*

Parameter	NW Group (n = 23), Normal		Control Group (n = 14), Normal		NW Group (n = 23), Fast		Control Group (n = 14), Fast	
	Before	After	Before	After	Before	After	Before	After
Right limb								
Contact time (ms)	652 ± 41	635 ± 44	642 ± 48	630 ± 48	533 ± 40	534 ± 38	532 ± 30	528 ± 23
F_z max braking (N)	854 ± 130	962 ± 133	802 ± 110	818 ± 131	1,011 ± 173	1,001 ± 160	921 ± 164	929 ± 157
F_z max push-off (N)	802 ± 117	807 ± 121	783 ± 99	789 ± 106	803 ± 136	798 ± 130	769 ± 109	778 ± 106
F_z average braking (N)	607 ± 99	615 ± 99	576 ± 90	576 ± 108	707 ± 123	715 ± 119	646 ± 130	661 ± 132
F_z average push-off (N)	540 ± 86	534 ± 85	527 ± 76	516 ± 85	505 ± 82	495 ± 75	500 ± 78	499 ± 82
F_y max braking (N)	149 ± 30	156 ± 31	143 ± 27	135 ± 54	192 ± 49	193 ± 42	182 ± 52	182 ± 45
F_y max push-off (N)	145 ± 24	153 ± 26	140 ± 27	143 ± 62	169 ± 38	171 ± 35	152 ± 33	154 ± 29
F_y average braking (N)	66 ± 15	71 ± 14	63 ± 13	62 ± 22	86 ± 21	89 ± 21	75 ± 24	79 ± 23
F_y average push-off (N)	64 ± 13	66 ± 13	64 ± 13	63 ± 15	70 ± 17	69 ± 15	69 ± 15	67 ± 12
Left limb								
Contact time (ms)	647 ± 37	633 ± 42	646 ± 50	635 ± 49	533 ± 38	535 ± 39	537 ± 28	532 ± 30
F_z max braking (N)	833 ± 145	852 ± 143	786 ± 117	790 ± 127	937 ± 240	974 ± 175	916 ± 155	906 ± 146
F_z max push-off (N)	779 ± 122	785 ± 124	764 ± 105	773 ± 109	727 ± 241	777 ± 111	772 ± 104	769 ± 120
F_z average braking (N)	593 ± 104	607 ± 99	572 ± 101	574 ± 101	647 ± 165	694 ± 120	641 ± 128	646 ± 122
F_z average push-off (N)	532 ± 87	526 ± 85	525 ± 81	527 ± 87	462 ± 145	487 ± 75	503 ± 78	503 ± 88
F_y max braking (N)	151 ± 35	155 ± 37	153 ± 36	155 ± 38	196 ± 50	196 ± 46	192 ± 55	185 ± 42
F_y max push-off (N)	147 ± 28	154 ± 28	143 ± 27	148 ± 30	168 ± 39	169 ± 30	163 ± 35	163 ± 37
F_y average braking (N)	66 ± 16	70 ± 17	66 ± 16	67 ± 16	84 ± 21	88 ± 20	81 ± 21	78 ± 22
F_y average push-off (N)	65 ± 14	66 ± 14	64 ± 13	66 ± 15	71 ± 32	69 ± 14	72 ± 16	70 ± 16

Note. F_z = vertical ground-reaction force; F_y = anteroposterior horizontal ground-reaction force.

Discussion

The results of this study show that Nordic walking contributes to positive changes in functional capacity after only 9 weeks. All but one functional test showed better performance after the intervention in the Nordic walking group. Gait analyses showed no statistically significant differences between groups.

Previous studies have shown that walking with poles improves cardiorespiratory function (Church et al., 2002; Kukkonen-Harjula et al., 2007; Porcari et al., 1997). In the current study results are in line with previous studies, showing an average improvement of 14% on the 2-min step test in the Nordic walking group compared with only about 3% in the control group. The physiological difference between Nordic walking and walking without poles is the result of the use of upper body muscles, which increases circulation, ventilation, and oxygen uptake. The use of the upper extremities seems to increase muscle strength, which plays an essential role in older people's everyday life. In the current study, upper extremity strength increased by 20% in the intervention group, which is in accordance with earlier studies (Karawan, 1992). Previous studies have shown that compared with walking without poles, there is less increase in leg strength during Nordic walking because of the support of the poles, which diminishes the training effect (Asikainen et al., 2006). In the current study, walking with poles led to a moderate increase of 15% in the muscle strength of the lower extremities among sedentary older people. Adequate muscle strength is essential for older people coping with everyday chores. This was also shown in the results of this study, as participants perceived an improvement in their ability to perform chores requiring extra exertion.

The greatest improvement (92%) was found in lower body flexibility as measured by the chair sit-and-reach test. Upper body flexibility measured by the back-scratch test also showed an improvement of 17%, but this was not statistically significant. Because an essential part of Nordic walking is stretching in warm-up and cooldown bouts, as well as in the middle of the training session, Nordic walking together with stretching exercise seems to be a good form of exercise to increase flexibility. Better flexibility helps elderly people negotiate everyday life. The back-scratch test used in this study particularly measures shoulder flexibility, which is essential in performing common tasks such as combing one's hair, putting on an over-the-head garment, or reaching for a car seatbelt.

It is well known that lateral sway during walking is increased in older adults (Woledge, Birtles, & Newham, 2005) and that walking becomes more unsteady as people age. This unsteady balance during gait is reflected in temporal gait parameters and increases the fear of falling (Maki, 1997). In the current study, walking balance was assessed by a 10-m-long force platform on which several consecutive steps could be collected. The 9-week Nordic walking exercise program did not improve walking balance in the exercise group. No differences between the groups were found in any gait variables. This may be explained by the fact that our subjects in both groups were reasonably healthy, young-old, and in good physical condition, thus having walking balance that was already quite good at baseline.

A strength of this study was that using an instructor to supervise the Nordic walking exercise sessions motivated the participants to exercise and kept the intensity of exercise at a level adequate to induce positive changes in functional capacity. In addition, the test battery used to measure the participants' functional capacity was specially developed for older adults. It was chosen because of the high reliability and validity of the tests (Rikli & Jones, 2001). A slight drawback of the test battery is that the researchers had to do the measurements themselves because a research assistant was not available. On the other hand, this ensured proper measurement of functional capacity. However, we have taken this drawback into consideration in interpreting the results. The number of participants in this study was satisfactory, but one of the limitations of the study was finding enough appropriate participants. When participants are recruited on a voluntary basis, there is always the possibility of a self-selection problem, in that the most active people, usually women, will enroll. That was the case in this study. A large number of volunteers were too physically active to meet the criterion of being sedentary. Because of the difficulty in getting a larger number of participants, two training groups were merged. For this reason we were not able to gather data from subjects walking without poles and analyze the difference between those data and Nordic walking data. This unbalanced the number of the participants in the different groups, so the results must be interpreted with caution. Previous studies have shown the benefits of Nordic walking compared with walking without poles among younger people (Church et al., 2002; Porcari et al., 1997), whereas the only difference among middle-aged women observed by Kukkonen-Harjula et al. (2007) between groups walking with or without poles was in leg strength in the one-leg squat, favoring walking without poles. Additional information from an older age group is still needed.

In summary, the current study expanded our knowledge about the effects of Nordic walking on physical performance among older people. Furthermore, it introduced a new perspective for studying the benefits of Nordic walking using the functional test battery, which measures physical attributes such as strength, endurance, flexibility, agility, and balance needed to perform everyday activities in later life. However, 9 weeks of Nordic walking exercise did not significantly affect gait balance. Additional studies are needed to assess the impact of Nordic walking exercise on gait balance in less capable and unfit elderly people. In the future, further studies are also needed to more precisely assess the differences in cardiorespiratory fitness (e.g., VO_2, heart rate at rest and during exercise) between Nordic walking and regular walking in older age groups. We found improvements in physical performance after a 9-week intervention of Nordic walking. Therefore, it can be considered a favorable form of physical activity for older people. Because it seems to also benefit those who have problems in mobility for health reasons (Baatile, Langbein, Weaver, Maloney, & Jost, 2000; Fregly et al., 2009; Oakley et al., 2008; Strömbeck et al., 2007), Nordic walking can be recommended for those who feel insecure in moving around outside their own homes because of difficulties in physical functioning.

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