

Original Article

Application of Pole Walking to Day Service Centers for Use by Community-dwelling Frail Elderly People[☆]Susumu Ota^{1*}, Hiroshi Goto², Remi Fujita^{1,3}, Midori Haruta¹, Yukari Noda⁴, Koji Tamakoshi⁵

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ARTICLE INFO

Article history:

Received 11 October 2012

Received in revised form

19 February 2013

Accepted 11 March 2013

Available online 24 April 2013

Keywords:

community-dwelling frail elderly people,
physical function,
posture,
quality of life

SUMMARY

Background: In an aging society, it is important to provide community-dwelling frail elderly with ongoing social services to maintain and improve their physical function. The purpose of this study was to investigate the effects of physical fitness, posture, and quality of life (QoL) on community-dwelling elderly using pole walking at a day service center.

Materials and methods: Participants were recruited from day service users, and a control group and intervention (pole walking) group were randomly selected. Pole walking group members were allowed to use poles during walking and ambulation in the daily routine of a day service center for 3 months. Thirty-five and 22 participants in the control and pole walking groups, respectively, were measured for physical fitness, posture, and QoL at the baseline and at the final session, and the measurements were compared to pre- and postintervention levels in both groups.

Results: In the control group, a timed up and go test after 3 months was performed significantly slower than at baseline ($p < 0.05$, power = 0.13, effect size = 0.13). The Physical Component Summary score of the MOS 8-item Short Form Health Survey was significantly increased compared to the score at baseline ($p < 0.01$, power = 0.64, effect size = 0.47) in the pole walking group.

Conclusion: The effects of 3 months of pole walking on community-dwelling elderly day service users showed improved Physical Component Summary scores of higher QoL. However, there was no significant effect of physical functions due to the intervention.

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1. Introduction

In aging societies, maintaining or improving the physical function, activities of daily living (ADL), and quality of life (QoL) of the elderly is important. It allows them to live independently and to have longer, healthier lives. The community care programs developed for these purposes have reduced the use of institutional care services and lowered mortality¹ in many countries. Japan introduced a universal-coverage long-term care insurance program in April 2000². Day service is one of the major in-home services covered by the long-term care insurance program. It is a facility-

based daytime program of nursing care providing meals and bathing, functional training, supervision, and socialization. It enables frail, older people who are in poor overall health, with multiple comorbid illnesses and varying physical or mental impairment, to remain in the community. The users of day service centers are also provided with transportation service, which enables participation in the day care service for the community-dwelling elderly who cannot travel from their home to the center by themselves, or do not have family members to take them there. For this reason, many frail elderly community-dwellers with deteriorated physical function are able to use day service centers. Therefore, intervention physical exercise used at day service centers must be one of the most adequate approaches for maintaining and improving physical function and ADL for the community-dwelling frail elderly. Moreover, because it was covered by the care insurance program, the day service center intervention could be continuously implemented. However, because only a few rehabilitation specialists (such as physical therapists and occupational

[☆] The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

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therapists) are affiliated with such centers in Japan, the intervention exercises at a day service center must be kept simple; the day care service users visit a few times/week and they have little time for intervention in real conditions.

Walking with poles has become widespread as a recreational exercise and sport. Using poles theoretically increases the weight-bearing area, and is assumed to stabilize walking for the elderly. There are several reports on the effects in patients with Parkinson's disease³ and intermittent claudication⁴. Pole walking is one of the styles used for walking with poles. The pole walking technique involves placing the pole in the front position (Fig. 1), which is the same method used with the T-cane. Therefore, pole walking was assumed to be a simpler walking technique for elderly people.

From the above, incorporating pole walking during walking or ambulation in the daily routine of day service centers is assumed to be an appropriate and adequate health intervention for the elderly in day service centers in real conditions. The purpose of this study was to investigate the effects pole walking application would have on the physical fitness and QoL of community-dwelling elderly using day service centers. Additionally, because using poles is expected to improve posture⁵, which is related to physical fitness in elderly people,^{6,7} the effect of pole walking on whole body posture was also examined in this study.

2. Materials and methods

2.1. Participants

Prior to the start of the study, its contents were first introduced in the Hanaso-kai, a day service center self-study group, at an explanatory meeting in Toyohashi City. The eligibility criteria of the day service center were registered by the long-term care insurance

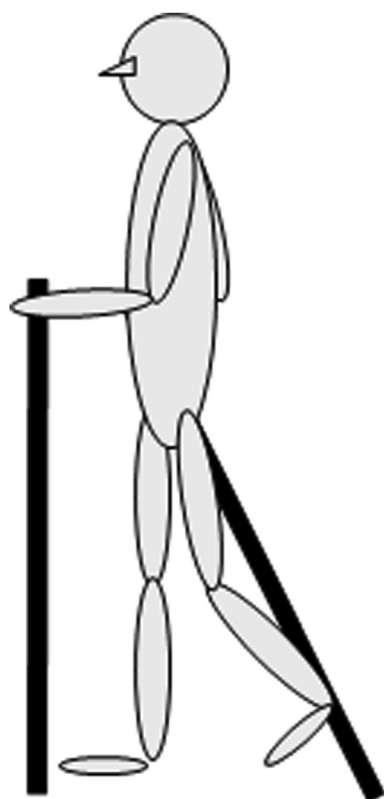


Fig. 1. Pole walking. Pole is positioned diagonally and makes contact with the ground in front of the body (forward pole position).

program. Participants who were recruited from five day service center facilities gave their consent after a previous explanatory meeting. The five facilities were randomized using randomly selected table numbers, with the intervention group (pole walking group) having two facilities, and the control group having three facilities. Inclusion criteria were being able to walk independently or to walk under supervision, to attend the day service twice/week, and to have no severe cognitive impairment (no orientation disorder and being able to do a 3-digit span backward). The exclusion criterion was the inability to use poles because of palsy of the hands and fingers. The baseline used as the first session in this study was from August 2010 to September 2010. The second session, established as final analysis after 3 months of intervention, was from November 2010 to December 2010.

Overall, a total of 66 participants (pole walking group: 28 individuals; control group: 38 individuals) were measured as the first outcome. The baseline characteristics and all measurements of the participants are shown in Table 1. All participants were informed as to the nature of the study, and informed consent in writing was obtained, as required by the Ethics Committee of the School of Medicine, Nagoya University.

Thirty-five and 22 participants in the control and pole walking groups, respectively, were evaluated in the second session, 3 months after the first session. A total of nine participants could not be measured at the second session (Refused to assess; $n = 2$, Sickness; $n = 4$, Bone fracture; $n = 1$, Leave day service; $n = 1$, Missed last visit; $n = 1$, Fig. 2). Differences in participant characteristics between both groups in the final analysis are shown in Table 1.

2.2. Intervention

Pole walking was used as the intervention for three months at day service centers the participants attended. Pole walking requires use of the pole in a diagonal position, though the pole makes contact with the ground in front of the body (forward pole position; Fig. 1). The length of the pole was adjusted to 65% of the participant's height. Pole walking was applied to the ambulation for ADL and walking as long as the participants could attend the daily

Table 1
Demographic and clinical characteristics of participants.

	Intervention ($n = 28$) mean (SD)	Control ($n = 38$) mean (SD)	p
Age (y)	82.9 (7.4)	82.6 (5.9)	0.874
Sex, male/female**	9/19	4/34	0.09
Height (cm)	148.1 (7.7)	143.3 (8.1)	0.017*
Weight (kg)	48.0 (10.7)	49.0 (11.0)	0.717
Timed up and go test, normal walking time	14.9 (5.6)	15.8 (5.9)	0.540
One-legged standing time with eyes open	3.8 (3.3)	4.4 (3.4)	0.418
Back muscle strength	33.3 (20.1)	26.4 (13.3)	0.102
Knee extension strength, right	124.9 (48.1)	142.3 (42.2)	0.124
Knee extension strength, left	122.6 (49.3)	141.6 (47.2)	0.117
Upper cervical angle	125.6 (11.5)	127.4 (12.1)	0.527
Neck slope angle	36.9 (9.4)	37.6 (12.0)	0.800
Thoracic spine angle	42.9 (13.1)	40.2 (15.3)	0.456
Lumbar spine angle	-8.7 (13.4)	-9.8 (11.5)	0.733
Pelvic plane angle	1.5 (8.9)	3.6 (8.1)	0.308
Knee joint angle	20.9 (8.1)	19.5 (10.3)	0.557
SF-8 Physical Component	47.1 (6.2)	45.0 (7.0)	0.217
Summary			
SF-8 Mental Component	50.1 (6.2)	49.6 (6.3)	0.728
Summary			

Data are presented as second, kg, or degree unless otherwise stated.

*Difference of continuous variables between intervention and control by unpaired t test. Significant differences at $p < 0.05$. **Fisher's exact test.

SF-8 = MOS 8-item Short Form Health Survey.

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