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Original Research—CME

Translation of a Motor Learning Walking Rehabilitation Program Into a Group-Based Exercise Program for Community-Dwelling Older Adults

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Abstract

Background: Traditional exercise programs for older adults, which focus on aerobic and strength training, have had only modest effects on walking. Recently, a motor learning exercise program was shown to have greater effects on walking compared with a traditional exercise program. Translating this novel motor learning exercise program into a group exercise program would allow it to be offered as an evidence-based, community-based program for older adults.
Objective: To translate a walking rehabilitation program based on motor learning theory from one-on-one to group delivery (On the Move) and evaluate multiple aspects of implementation in older adults with impaired mobility.
Design: The translation process involved multiple iterations, including meetings of experts in the field (Phase I), focus groups (Phase II), and implementation of the newly developed program (Phase III). Phase III was based on a one-group model of intervention development for feasibility, safety, potential effects, and acceptability.
Setting: Community sites, including 2 independent living facilities, an apartment building, and a community center.
Participants: Adults 65 years of age or older who could ambulate independently and who were medically stable. Thirty-one adults, mean age 82.3 $\pm$ 5.6 years, were eligible to participate.
Methods: The group exercise program was held twice a week for 12 weeks.
Main Outcome Measurements: Acceptability of the program was determined by retention and adherence rates and a satisfaction survey. Risk was measured by adverse events and questions on perceived challenge and safety. Mobility was assessed pre- and postintervention by gait speed, Figure of 8 Walk Test, and 6-minute walk test.
Results: Modifications to the program included adjustments to format/length, music, education, and group interaction. The 12-week program was completed by 24 of 31 entrants (77%). Adherence was high, with participants attending on average 83% of the classes. Safety was excellent, with only 1 subject experiencing a controlled, noninjurious fall. There was preliminary evidence for improved mobility after the intervention: gait speed improved from 0.76 $\pm$ 0.21 to 0.81 $\pm$ 0.22 m/s, $P = .06$; Figure of 8 Walk Test from 13.0 $\pm$ 3.9 to 12.0 $\pm$ 3.9 seconds, $P = .07$; and 6-minute walk test from 246 $\pm$ 75 to 281 $\pm$ 67 m, $P = .02$.
Conclusions: The group-based program was safe and acceptable to older adults with impaired mobility and resulted in potentially clinically meaningful improvements in mobility.

Introduction

Impaired mobility is a common and costly problem for older adults. Exercise is believed to improve mobility and prevent disability. Current exercise recommendations for older adults focus primarily on aerobic and strength training [1]; however, studies incorporating these standard exercise programs have shown only modest improvements in walking [2-4].

Walking is a complex task that places demands on multiple systems, including the cardiopulmonary, musculoskeletal, and nervous systems. Current exercise programs address the cardiopulmonary and musculoskeletal systems with aerobic and strength training but

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overlook the nervous system. Given that many older adults have subclinical neurologic deficits that contribute to mobility limitations [5-8], incorporating neurologic training into exercise for older adults may result in improved mobility.

An individual exercise program that incorporates elements of motor skill training, often used in neurologic rehabilitation, was developed to reduce the energy cost of walking in older adults with mobility limitations. This novel motor learning exercise program was based on task-oriented, motor skill-based exercise principles. Motor skill-based exercise includes: (1) a defined movement goal; (2) movement to gain knowledge of muscles and postures; (3) practice to correct errors in movement and to develop and adjust motor plans; and (4) a challenge to select the optimal motor plan. This program challenges the brain to adapt and learn the appropriate timing and sequence of movements in synchronization with the postures and phases of gait to improve walking. The program includes stepping and walking patterns to promote the appropriate timing and coordination of stepping throughout the gait cycle by enhancing proper weight transfer during stepping and interlimb timing during walking. Compared with a standard exercise program (ie, aerobic and strength training), the motor learning exercise program resulted in significantly greater improvements in energy cost, walking confidence, self-reported function and disability, gait speed, and challenging gait tasks [9-11].

The evidence for the benefits of this motor learning exercise was based on a one-to-one approach provided by experienced physical therapists. Translating this novel motor learning exercise program into a group exercise program would allow it to be offered as a community-based program, providing evidence-based therapeutic exercise to older adults who would benefit whether or not they would qualify for, have access to, or have been referred for physical therapy services. Therefore, the purposes of this article are (1) to describe the operational translation of an individual motor learning exercise program into a group-based exercise program (On the Move) and (2) to describe the acceptability, risk, mobility outcomes, and feasibility of the On the Move program in community-dwelling older adults.

Methods

Overview

An iterative process was used to translate the individual motor learning walking rehabilitation program into a group-based exercise program called On the Move. The individual program was modified into a group program via expert opinion (Phase I). The group program was then administered to older adults, who provided feedback about their experience with the group exercise through focus groups (Phase II). The program was modified accordingly and then implemented at 4 separate facilities (Phase III). The acceptability, risks, effectiveness, and feasibility of the program were evaluated. The University of Pittsburgh Institutional Review Board approved this research, and all subjects provided informed consent.

Phase I: Expert Opinion

The individual program was developed into a group program over multiple meetings with 9 physical therapists. These therapists were familiar with the individual program and/or had experience working with older adults and conducting group exercise classes. Multiple aspects of the program were discussed, including, but not limited to content and format of the program, length of the class, progression of the exercises, and use of music and equipment. The goal of Phase I was to adapt the individual program into a feasible and safe group program.

The initial modification of the individual program into a group program focused primarily on the issue of safety while still maintaining the content of the program. The individual program had been performed one-on-one or in small groups with no adverse events; however, because of the standing and walking aspects of the program, the safety of the participants in a group setting was a concern. After a review of the literature and discussion with the expert therapists, a group size of no more than 10 participants was determined as what 1 physical therapist and 1 assistant could safely accommodate in the program. The experts also determined that the program initially should be conducted with older adults who ambulated independently and did not require physical assistance to stand or walk.

Phase I of development resulted in a 30-minute continuous class consisting of a warm-up, walking patterns, stepping patterns, strengthening, and stretching/cool-down being performed to a variety of musical artists and genres. The older adults would be instructed to hold onto a solid surface (ie, table or chair) for support during the warm-up and stepping patterns because of the balance and safety concerns. Playground balls would be used during the stepping patterns to facilitate group interaction. To educate and motivate the older adults, the instructor would discuss the rationale behind the exercises and activities while performing them.

Phase II: Feedback From Older Adults

The goal of Phase II was to determine whether the older adults liked the program and if they would attend such a program on a regular basis. To obtain input