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Feature Article

Does dance-based therapy increase gait speed in older adults with chronic lower extremity pain: A feasibility study



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ABSTRACT

A decreased gait speed in older adults can lead to dependency when the individuals are no longer able to participate in activities or do things for themselves. Thirty-seven senior apartment residents (31 females; Mean age = 80.6 years; SD = 8.9) with lower extremity pain/stiffness participated in a feasibility and preliminary efficacy study of 12 weeks (24 sessions). Healthy-Steps dance therapy compared to a wait-list control group. Small improvements in gait speed ([ES] = 0.33) were noted for participants completing 19–24 dance sessions. Improvements in gait speed measured by a 10 Meter Walk Test (0.0517 m/s) exceeded 0.05 m/s, a value deemed to be meaningful in community dwelling older adults. These feasibility study findings support the need for additional research using dance-based therapy for older adults with lower extremity pain.

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A decreased gait speed in older adults can lead to dependency when the individuals are no longer able to participate in activities or do things for themselves.¹ Treatment of lower extremity pain focuses on diagnosing the cause and surgical or non-surgical interventions, as appropriate, to relieve symptoms and improve gait function.

Referred to as the “sixth vital sign,”² gait speed can predict adverse outcomes for older adults including hospitalization, requirement for a caregiver, and accidental falls.³ Gait speed below 0.6 m/s is considered a “red flag” for decreased mobility in older adults and classifies the person as “household” walker.² This can impact an older adult’s independence with activities of daily living (ADLs), thus the older adult is more likely to be hospitalized, need interventions to reduce the risk of falls, and is more likely to be discharged to a skilled nursing facility. Gait speeds between 0.6 and 1.0 m/s are considered “yellow flags,” moving the older adult into the category of “limited community ambulation.” Gait speeds over 1.0 m/s are considered “green flags” and indicate independence with ADLs; the older adult is less likely to be hospitalized and have

an adverse event and is more likely to be discharged to home.² Typical gait speed in healthy adults is 1.3 m/s,⁴ the same gait speed required to cross the street at an intersection at a stoplight in the United States.^{4,5} Gait speed can be expected to be reduced due to normal joint and muscle aging in older adults; comfortable gait speed for an otherwise healthy 80–89 year old female is estimated between 0.80 and 1.5 m/s.^{6–8} With an assistive device this decreases to 0.63 m/s and without an assistive device this increases to 0.91 m/s.⁷

There is accumulating evidence that physical exercise using dance may have a therapeutic effect on gait speed. Many older adults were engaged in dance as a social activity in the 1940’s and 1950’s. However, the use of dance as a therapy has been growing. Lee, Tabourne, and Harris⁹ have recently reported that the universal, primal nature of dance entrances participants to stay involved in a therapeutic dance program. Dance can provide an outlet for older adults to enjoy leisure and, at the same time, enhance their physiological function. Dance-based therapy for older adults needs to be gentle, slow, and include options to be performed standing or sitting depending on fatigue or pain level, which can change day-to-day.

Integrating motor and cognitive components are key features of programs using music and dance as therapy.¹⁰ Dance-based therapy

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is being integrated with conventional medical treatments for many conditions.^{11,12} Dance is potentially non-invasive effective method to improve gait speed with the possibility of high adherence due to social engagement provided by group interaction.

Following use of dance-based therapy, there is evidence of improved balance and strength^{10,11}; among healthy older adults, measurable increases in gait speed have been reported.^{10–13} However, there is a gap in the literature regarding therapeutic dance-based programs for older adults with decreased gait speed resulting from lower extremity pain.

Healthy-Steps, also known as The Lebed Method (TLM) is a medically-based dance-based therapy program, based on movements that are used in physical and occupational therapy programs, which is recommended for populations with physical difficulties.¹⁴ Using slow, rhythmic movements and low-impact, easy dance movements, Healthy-Steps can be done sitting or standing. Led by a trained and certified instructor, the Healthy-Steps method includes movements choreographed to the participants' generational music choices and is suitable for older adults with chronic disorders. Healthy-Steps has been used since 2000 internationally with populations who have lower extremity physical limitations, but has not been specifically tested with older adults who have lower extremity pain or self-reported osteoarthritis.^{15–17}

Prior research tested Healthy-Steps with community dwelling older adults and noted small to medium effects in improving balance and mobility.^{13,17} Results confirmed that older adults will 1) initially consent to participate in dance therapy, 2) continue to attend dance sessions, 3) express enjoyment during the dance sessions, and 4) demonstrate increased activity during the dance sessions.¹⁷

The purpose of this pilot study, however, was to focus specifically on the feasibility and impact of Healthy-Steps with older adults with known chronic lower extremity pain. The hypothesis was that 12 weeks (24 sessions) of dance-based therapy will increase gait speed in older adults with self-reported lower extremity pain, compared to no dance-based therapy sessions. Multiple measures of gait speed were used to inform future research.

Methods

Design

This study used a two-group pretest-posttest 12 week (24 sessions) Healthy-Steps intervention with a wait-list control group. The wait-list control group did not participate in the dance sessions during the study but continued normal activity and had an opportunity to participate in Healthy-Steps dance sessions after all of the posttest data were collected.

For this study, a specialty team of certified Healthy-Steps instructors (nurses, physical therapist, and music therapist) created a customized Healthy-Steps protocol, based on Healthy-Steps dance movements that could be safely performed by older adults with self-reported lower extremity pain and/or stiffness. Instructors conducted a 45-min session two times weekly for 12 weeks, for a total of 24 sessions. Each session began with a warm-up and included routines that could be completed sitting or standing. A chair was positioned behind each participant and reminders were given throughout each session to use slow, rhythmic movements and rest as needed. These safety measures, reminders and cues were used to decrease the risk for falls and to directly address fear of falling issues with participants. The Healthy-Steps dance protocol intervention included movements to potentially increase gait speed and reduce lower extremity pain when repeated multiple times over a 12-week period. These included dance-based movements to stretch lower extremities; shift weight from side to side;

strengthen feet, thighs, and hips; and develop flexibility of hips, knees and thighs. The low-impact aerobic nature of the protocol helped to increase respirations, thus giving muscles oxygen to perform at full capacity.

The study was approved by an intuitional review board in a university setting. Strategies for recruitment included placing an announcement poster at the senior apartments, flyers distributed by the apartment management, and 30-min demonstration and information sessions by the principle investigator (PI) and Healthy-Steps instructors. To support retention in the study, all participants were compensated with a \$10 Walgreen's gift card when pretest measurements were completed and a \$30 Walgreen's gift card when posttests were completed.

Sample and screening

The PI or co-investigator contacted interested residents to conduct a phone screening for eligibility or schedule a face-to-face screening. Fifty-two older adults were interested in participating in the study and were screened; 37 were recruited, consented and enrolled, reaching 93% of the targeted goal when the study was closed to enrollment. Participants were eligible to participate in the study if they were: 1) adults 62 years and older; 2) able to read and write English; 3) living in one of two identified senior apartments; 4) could answer "yes" to the question: "In the past year, were there times when you had knee or hip pain or stiffness so it affected your function?"; 5) able to score <8 on the Short Blessed Test; 6) able to ambulate independently, with or without an assistive device; 7) available to attend the pretest–posttest and dance sessions (not traveling, etc.); 8) having no physical problem limiting participation in mild low impact, slow rhythmic movements during the dance sessions.

All participants completed baseline testing prior to group assignment. The participants were randomized to either the dance group plus continue normal exercise routine (walking, group exercise to videos, group exercise with live leader) or the wait-list control group, to continue normal exercise routine (walking, group exercise to videos, group exercise with live leader) with an opportunity to participate in dance-based therapy sessions after the study was finished. Randomization was done by computer-generated random numbers.

Measures

Descriptive information collected at baseline included age, gender, race, marital status, education, living situation, employment and volunteer status, income, chronic conditions (including arthritis), and use of an assistive device. Participants reported the presence of pain/stiffness (Yes/No) at baseline and post-intervention on the Functional Pain Scale (FPS),¹⁸ and recorded what pain medications they were taking at baseline and post-intervention. Gait speed measurements were completed at baseline and the week the intervention was completed using several tests to determine the best measure to use in this population for a future study. First, the 8-foot walk (faster of two trials) was completed.¹⁹ Participants were instructed to walk across a room at their usual gait speed. The Timed Up and Go (TUG) test was collected as an additional measure of gait speed, also measuring agility and dynamic balance.²⁰ Participants were instructed to get up from a chair, walk to an 8-foot targeted location, and return to sit in the chair. The mean value of two trials was used.

A dance-based therapy subgroup ($n = 8$) and wait-list control subgroup ($n = 8$) were randomly selected for additional pretest-posttest gait speed assessments using the GAITrite electronic walkway, after the initial allocation was completed (see Fig. 1).

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