

# Dance-Based Therapy in a Program of All-inclusive Care for the Elderly

## An Integrative Approach to Decrease Fall Risk

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**Background:** Loss of balance and diminished gait are major fall risk factors in older persons. Literature suggests that physical activity based on dance may improve balance and gait. The aim of this pilot study was to determine whether dance-based therapy affects the balance/gait of community-based frail seniors. **Conceptual Framework:** The Roy Adaptation Model and Environmental Press Theory were used as joint frameworks. **Participants:** Eleven participants were recruited from a Program of All-inclusive Care for the Elderly (PACE). Inclusion criteria were (1) Mini-Mental State Examination score of 23 or more, (2) attending PACE on Monday, Wednesday, and Friday, and (3) able to stand with or without assistance. **Methods:** A Lebed Method dance intervention was conducted using a longitudinal design 3 times a week for 6 weeks. Functional Reach and Timed Get Up and Go were measured at baseline, 6 weeks after the start of the intervention, and 6 weeks postintervention and repeated to estimate the persistence of the effect. **Conclusions:** Graphs were compared looking for functional trends; postintervention interviews were conducted with each subject. **Implications:** Dance therapy results in positive functional trends, suggesting that further study using dance-based therapy will be useful to decrease fall risks in older persons. **Key words:** *balance, dance-based therapy, fall risk, gait*

**O**UR NATION is facing a crisis; 1 in 3 persons 65 years and older falls each year.<sup>1</sup> Of those who fall, 20% to 30% suffer injuries that negate independent living and increase

chances of early death.<sup>2</sup> The magnitude of the falling crisis in older persons is an escalating economic burden. The Centers for Disease Control and Prevention estimates that the direct medical costs of falls among persons 65 years and older in the United States totaled \$200 million for fall-related fatalities and \$19 billion for nonfatal, fall-related injuries in 2000.<sup>3</sup> Fractures accounted for 35% of nonfatal injuries and 61% of costs. Without effective interventions to impact this crisis, the financial toll is expected to increase as the population ages and is projected to reach \$54.9 billion by 2020.<sup>4,5</sup>

Fall risk factors are multifactorial and can be predetermined; therefore, actions can be taken to reduce the occurrence and severity of falls.<sup>6</sup> The major risk factors for falls in older persons include physical, environmental, and

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psychosocial dimensions.<sup>7-10</sup> Loss of balance and decreased mobility are major physical risk factors for falls in older persons.<sup>11,12</sup>

One solution to the emerging fall crisis often suggested is traditional exercise programs to improve balance and mobility. However, traditional exercise has not been readily adopted by older persons because of barriers that include fear of falling, health problems, and motivation to exercise.<sup>13,14</sup> An alternate choice to traditional exercise is dance-based therapy. Dance engages older people, promoting adherence and enhancing motivation.<sup>15</sup> In addition, evidence suggests that older people are happier dancing than performing aerobic exercise, with measurable increases in quality of life, improved balance, and mobility.<sup>16-18</sup> This pilot study was designed to explore whether a dance-based therapeutic movement intervention makes a difference in the functional status (balance/gait) of community-based frail seniors.

Programs of All-inclusive Care for the Elderly (PACE) have served as interdisciplinary sites to conduct research on community-based frail seniors. Participants at PACE are frail older persons who meet the state Medicaid requirements for nursing home placement. They choose to live in the community, supported by family caregivers and the comprehensive interdisciplinary services that PACE provides. The comprehensive care includes all aspects of acute and long-term care under one capitated health delivery system.<sup>19</sup> Programs of All-inclusive Care for the Elderly are required to ensure that participants can be maintained safely at home. A falls program is generally accepted to be a part of this process. Thus, interventions to decrease fall risk are critical for PACE to explore. The PACE philosophy, using a holistic approach to care for frail older persons, provides an ideal setting to conduct a dance-based pilot study to increase balance and gait, thus decrease fall risk. This study, partnering with research professors at the University of Missouri, combined the expertise of the practicing interdisciplinary team at PACE with seasoned gerontological researchers to guide the study.

## OBJECTIVES

Dance is an enjoyable social activity for many older persons.<sup>20,21</sup> The research on the psychosocial aspects of dance in older persons supports this assertion.<sup>15</sup> Physically, dance promotes movement of the head and trunk; the center of gravity is shifted in every direction from the axis of support. This impacts factors that contribute to balance and joint mobility.<sup>16</sup>

The emerging research on the physical benefits of dance-based therapy supports the proposed intervention. A study using Caribbean dance steps twice weekly for 3 months reported significant improvements in balance.<sup>16</sup> Another study reported improvements in mobility following 20 Tango sessions for patients with Parkinson disease compared with traditional exercise.<sup>22</sup>

A specific type of therapeutic dance, The Lebed Method (TLM), was used in this study. The Lebed Method, developed by a professional dancer and her physician brothers, was originally created as dance-based therapy for women with lymphedema. The same movements have been found to be beneficial for other persons with conditions that limit upper and lower body movement, range of motion, and balance. This method was used in a study with a group of breast cancer survivors to increase range of motion, and investigators reported positive results after 18 sessions conducted over 12 weeks.<sup>20</sup> The Lebed Method was chosen for the pilot study at PACE because it can be performed sitting or standing as shown in Figures 1a and 1b, thus providing a safe, feasible intervention for frail seniors as well as for healthy seniors.<sup>21</sup>

The Lebed Method combines low-impact dance with upbeat participant-specific music.<sup>20</sup> A certified TLM instructor, who was also a master's prepared dancer, choreographed the dance routine for frail seniors to correlate with specific balance and mobility outcomes as outlined in Table 1.<sup>21</sup> Dance steps can be customized on the basis of specific interests of the participants. In the pilot study, a new step was created and titled



(a)



(b)

**Figure 1.** The Lebed Method: (a) standing and (b) sitting dance routine at Program of All-inclusive Care for the Elderly.

*Shoe Shine*, after it was discovered 1 of the participants has been a shoeshine man his entire life.

### THEORETICAL FRAMEWORK

The Roy Adaptation Model and Environmental Press Theory were used as a joint framework. The Roy Adaptation Model states

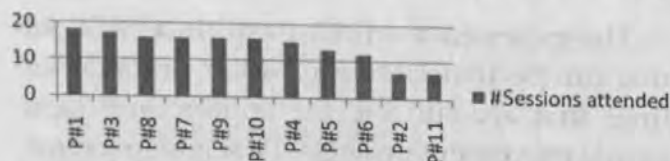
that a person is an adaptive system with 4 adaptive modes: physiological, self-concept, role function, and interdependence. Conceptually, adaptation means to adjust to the environment and affect the environment. Persons adapt by coping mechanisms.<sup>23</sup> Lawton and Nemohow's<sup>24</sup> Environmental Press Theory compliments the Roy Adaptation Model, which states that the person strives to achieve a "zone of maximum comfort" and physical competence helps adapt to the environment.

### PARTICIPANTS

Following institutional review board approval from the University of Missouri, 11 study participants, 7 women and 4 men, were recruited from the Alexian Brothers Community Services PACE, St Louis, Missouri. This small group size could be safely monitored during the dance sessions. All of the participants met the inclusion criteria of attending

**Table 1.** The Lebed Method dance routine for Program of All-inclusive Care for the Elderly pilot 2008

Routine/music	Movements	Intended outcome
Warm up	Deep breathing, head, chin, chest, rolls, ear to shoulder, arm circles, easy marches	Open up chest and lungs; give muscles oxygen to perform well
Dance 1/ <i>Beautiful Morning</i>	Spine roll up, sway, step touch, jazz shoulders	Develop balance and strengthen lower extremities
Dance 2/ <i>Sweet Inspiration</i>	Seated: march, touch toe, hand to shoulder, heel lift	Shift weight from side to side; develop balance
Dance 3/ <i>Ha Hias</i>	Step forward, step back, one arm swim, shimmy with ballet plie, easy swing with ballet plie	Balance and strengthen lower legs
Break/ <i>Grooving</i>	Everyone drinks water, relaxes, rests, visits	Group sharing; benefit of social aspect of dancing
Dance 4/ <i>Hold On</i>	Hips swing side to side, hips push forward, climb the ladder, arms open high/cross, put out the fire, strut your stuff	Accommodate shifting movements; develop balance and flexibility
Dance 5/ <i>Celebration</i>	<i>Shoe Shine</i> , shut the door, side reach, bow and arrow, circle the world, arm swings	Accommodate shifting movements; develop balance and flexibility
Cool down/ <i>Pennies From Heaven</i>	Each person speaks and shares a blessing, joy, gratitude	Group sharing, benefit of social aspect of dancing



**Figure 2.** The Lebed Method dance sessions at Program of All-inclusive Care for the Elderly.

the PACE center 3 times per week, having a Mini-Mental State Examination score of 23 or more, and the ability to stand with or without an assistive device.

## METHODS

A longitudinal study design was used, with TLM intervention for 45 minutes, 3 times each week for 6 weeks.<sup>25</sup> A total of 18 "doses" of dancing were offered on the basis of the recommended intervention length from related studies.<sup>16,20,22</sup> There was no attrition; 1 study subject completed the intervention but disenrolled from PACE prior to postintervention data collection. The participants attended most dance sessions as shown in Figure 2.

## DATA COLLECTION AND ANALYSIS

A Functional Reach (FR) test for balance and Timed Get Up and Go (TGUG) for gait were measured at 3 times: baseline, 6 weeks after the start of the intervention, and 6 weeks postintervention. The FR measures the distance a person can reach forward without losing balance; the further one can reach without losing balance, the lower the fall risk. Interrater and test retest reliabilities are high ( $r = 0.92$ ), as is intrarater reliability ( $r = 0.98$ ). Scores with less than 7 in indicate limited functional balance.<sup>26</sup>

The TGUG measures the time it takes a person to stand up from an arm chair, walk 10 ft, turn around, walk back to the chair, and sit down. More than 14 seconds is a predictor of high risk for falls. The interrater reliability of the TGUG is high ( $r = 0.99$ ).<sup>27</sup>

Improvements from baseline to the end of the intervention period provided an estimate

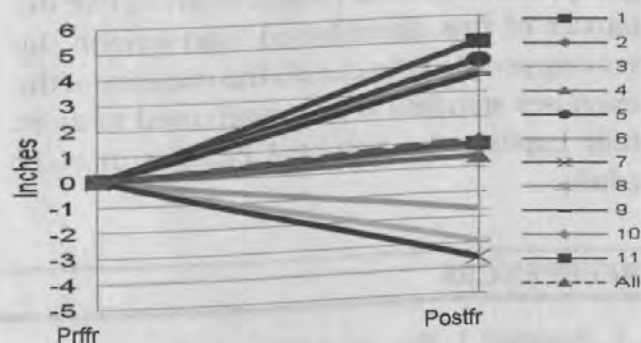
of the effectiveness and persistence of the intervention. Since this was a pilot study, the primary goal was not to show statistically significant differences but rather to get estimates of the possible effect of the intervention on these outcome measures so that they can be used in future, planned studies. For this analysis, pre- and post-FR and a combined measure of FR-TGUG were used to estimate the combined functional effect from the intervention.

## RESULTS

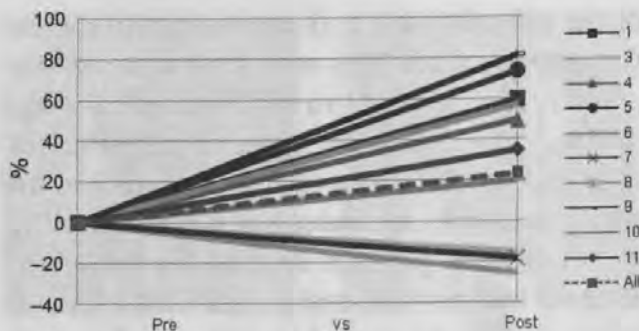
Comparison of pre- and post-FR and TGUG indicates positive trends in the functional status of the participants. The improvement in the FR from baseline to the end of the intervention was noted in the majority of the participants as shown in Figure 3. The change in FR tends to group into 3 types of responders: improved (average of 4 in), no change (average of 1 in), and worsen (average of -2 in) as shown in Figure 3.

Figure 4 displays the overall functional measure related to balance and gait as depicted by percentage of change (FR score divided by TGUG) that resulted from the intervention. When combined with TGUG, most participants showed global improvement of about 50% from baseline in this scoring schema. The 6 weeks postintervention measurements showed no trends in persistent effects.

The study results confirm that older persons will (1) initially consent to participate in dance therapy, (2) continue to attend dance sessions, (3) express enjoyment during the



**Figure 3.** Change in pre- and post-Functional Reach (FR).



**Figure 4.** Overall changes in pre- and post-Functional Reach (FR) and Timed Get Up and Go (TGUG).

dance sessions, (4) demonstrate increased activity during the dance sessions, and (5) self-report improved balance and gait. One hundred percent of the participants indicated that they would recommend this program to other older persons. Ninety percent said that they would sign up for the program again. Participants shared how much they enjoyed the social aspect of the program. Fifty percent of the participants self-reported that their balance and gait had improved. The pilot results revealed trends in the small sample, indicating the dance intervention has the potential to improve physical function.

## CONCLUSIONS

On the basis of the results of this pilot study, a functional difference was noted in several of the participants before and after TLM intervention. The study participants were all frail seniors, with multiple comorbidities impacting overall function. Further study is warranted with a larger sample size, a control group, and additional measures to explore the impact of this dance-based intervention. Involving people who can do the majority of the exercises standing is also warranted to more fully explore the potential benefits in older adults.

The experience working within a PACE setting can be translated into other practice settings that are suitable for conducting therapeutic movement projects. First and foremost, the initial and sustained support from the leadership team was critical to the success of this project. This allowed dedicated team members (the nurse principal investigator and the physical therapist coinvestigator) for the 6-week commitment to facilitate this project. Assistance from the dietary, activities, day center, nursing, transportation, marketing, and information technology departments was also critical for participants to engage in sessions. The assistance ranged from transporting the participants to the PACE center 3 days each week, to providing early lunches for them, and to photographing and videotaping the dance program.

Because pilot study was successful, an Alexian Brothers Ministry grant was awarded to the nurse principal investigator and the physical therapist coinvestigator to attend a 3-day TLM certification course. The dance program is being expanded and offered to all participants at this PACE facility.

## IMPLICATIONS FOR NURSING ADMINISTRATION

The crisis related to fall risks in older persons does not need to continue. Creative interventions have the potential to improve fall risk and reduce falls. Nursing administrators can facilitate research that measures the impact of programs such as dance-based therapy on fall risk and quickly move these programs into practice. We can improve balance and gait, thus reducing fall risk and subsequently decreasing the number of costly, life-changing, and injurious falls. This pilot study is a step toward measuring improvement in balance and gait following dance-based therapy.

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