

## Tango for Two

### Statement of Need

Tango for Two will address Parkinson Disease, as it is reported to affect 6 million individuals globally.<sup>1</sup> Parkinson Disease is defined as a “progressive neurodegenerative disease” that is chronic and affects the individuals’ movements, postural stability, mobility, and increases their falls risk.<sup>1,2</sup> Those with Parkinson disease have a 50-68% incidence of falls per year and 27% of these individuals will fracture their hip within 10 years of being diagnosed with this disease.<sup>3</sup> Decreasing the falls risk in this population may decrease the resultant injuries and costs to the healthcare system.<sup>3</sup> Additionally, slowing the progression of this disease through early activity and exercise may decrease costs by postponing the need for nursing home care.<sup>2,4</sup> This program will incorporate tango and lower extremity strengthening exercises to decrease the individuals’ falls risk while improving mobility and quality of life and reducing medical costs on a global level.<sup>1,2</sup>

### Background

Tango for Two could decrease the number of falls experienced by those with Parkinson disease, therefore decreasing the associated healthcare costs, while improving mobility and quality of life measures for these individuals.<sup>1,2</sup> Dance may improve balance, mobility, motor performance, and physical activity compliance while decreasing depressive symptoms in this patient population.<sup>1</sup> As strength is also evidenced as an important factor in maintaining balance, the program will additionally

include lower extremity strengthening exercises.<sup>2</sup>

Tango for Two is a program that targets the individual, interpersonal, and community levels of the Social Ecological Model while exerting its influence on the population level. This program may improve the individual's self-esteem, motivation, and compliance with physical activity.<sup>1,5</sup> It has been proposed that assuming the lead dance role may increase the individual's motivation, as they might be dependent on their caregivers for other activities.<sup>5</sup> Also the individual's enjoyment of the intervention may translate into compliance with the program and continued performance of the activity.<sup>1,5</sup> This enjoyment experienced may serve as reinforcement for participating in this physical activity, according to the Social Cognitive Theory.<sup>6</sup> Dance may additionally promote self-esteem through the accomplishment of dance movements.<sup>5</sup> Self-esteem is one of the three major constructs in the Social Cognitive Theory that may assist in influencing those with Parkinson disease to continue participating in this dance class and decrease their falls risk.<sup>6</sup>

By focusing on interpersonal relationships, Tango for Two aims to encourage positive relationships with family members and caregivers while increasing the individual's social networks through building supportive relationships between dance partners.<sup>1,5</sup> This employs the environmental constructs of the Social Cognitive Theory including social support, observational learning, and normative beliefs.<sup>6</sup> The dance class involves socialization and participation from caregivers, which may motivate these individuals to continue to be involved in this activity.<sup>1</sup> Dance may encourage supportive relationships between dance partners when assisting one another in maintaining balance.<sup>5</sup> The participants are able to learn from others who also have Parkinson

disease and observe their success while potentially establishing new beliefs that those with Parkinson disease can successfully participate in physical activity and maintain their balance.<sup>6</sup> Additionally, these individuals may experience an increase in self-efficacy when their partner follows their dance movements.<sup>5</sup> This could lead to increases in collective efficacy when dance partners successfully complete a routine together as a team.<sup>6</sup>

The individual's socioeconomic status and income may influence other levels of the Social Ecological Model. In the United States, Parkinson disease is responsible for \$14.4 billion or more per year due to decreased employment and increased medical costs.<sup>4</sup> This means that the economic burden for the individual with Parkinson disease is an average of \$22,800 as there is an estimated 630,000 individuals diagnosed with this disease nationally as of 2010 which is thought to double by 2040.<sup>4</sup> Individuals with Parkinson disease are ten times more likely to live in nursing homes, which accounts for \$5 billion or more of the disease related costs.<sup>4</sup> These high costs may place a financial strain on the individual and his or her family in addition to the costs to the healthcare system.<sup>4</sup> It may also place a strain on the individual's relationships with other family members and limit the individual's access to the community due to a lack of finances in addition to decreased physical abilities.

Tango for Two will target these areas of strain by slowing the progression of Parkinson disease and providing the individuals and their family members with access to the community at no cost to them.<sup>2,4</sup> Tango for Two will take place after hours at a facility that volunteers their space. This facility will be in a central location that is easily accessible for participants that live in the area. The individuals leading the class will be

a physical therapist and a dance teacher who volunteer their time, however, will accept donations when given. Tango for Two aims to create a positive environment to participate in physical activity and engage in the community for individuals with Parkinson disease and their family members.

Tango for Two will present these individuals with the opportunity to increase their social interactions and gain social support in the community. Lötcke et al. 5 note that strengthening these individuals' social networks while increasing their self-esteem may help these individuals to have "greater feelings of well-being." Tango for Two will include partner dancing which has been found to build relationships by having to trust one's partner to assist with balance.<sup>5</sup> Lötcke et al. 5 also note that goals related to family relationships are important for these individuals but are rarely included in rehabilitation. Tango for Two will include these goals in the classes by encouraging family participation. Additionally, by incorporating family participation into the program, the family members can also function as support for adherence to the program as well as continued participation in physical activity.<sup>1</sup>

At the population level, Tango for Two has the potential to decrease falls risk and the associated medical costs.<sup>3</sup> The incidence of falls for those with Parkinson disease are 50-68% a year with 27% of this population sustaining a hip fracture within 10 years after diagnosis.<sup>3</sup> As activity and exercise have been shown to slow the progression of Parkinson disease when initiated early, this program could be beneficial in decreasing the overall costs of care by postponing the need to place the individual in a nursing home.<sup>2,4</sup>

## Program Goals

The overall goal for Tango for Two is to decrease the participants' falls risk while increasing their quality of life. This will be accomplished through improved balance, functional lower extremity strength, and gait speed.

After 10 weeks of participating in Tango for Two, the program participants will decrease the number of falls they experience by 90% as measured by self-reported falls.<sup>5</sup> The participants incidence of falls will be measured before the program begins and after completion in order to determine goal accomplishment.

After 10 weeks of participating in Tango for Two, the program participants will improve their balance as measured by an increase of at least four points in their score on the Berg Balance Scale in order to decrease their falls risk.<sup>1,5</sup> Though a minimally clinically important difference on this measure has not been established for those with Parkinson disease, a change in 3.8 points was determined to be significant in a study included in the systematic review by Lötze et al for which an overall significance was found in favor of Tango to improve balance using this measure.<sup>5,7</sup>

After 10 weeks of participating in Tango for Two, the program participants will improve their functional lower extremity strength as measured by an increase of three stands on performance of the 30 second sit to stand test.<sup>8</sup> Though a minimally clinically important difference has not been established for this measure in those with Parkinson disease, it has been established in those with hip osteoarthritis as a 2.6 change in score.<sup>8</sup>

After 10 weeks of participating in Tango for Two, the program participants will improve their quality of life as measured by an decrease of 8 points in their score on the Parkinson's Disease Questionnaire-39.<sup>1,5</sup> The systematic review by Lötze et al

included a case report that showed an improvement of 7.9 points in this measure after participating in Tango for 10 weeks.<sup>5</sup>

After 10 weeks of participating in Tango for Two, the program participants will improve their gait speed by decreasing their time of completion on the Timed Up and Go measure by two seconds.<sup>1,5</sup> The systematic review by Shanahan et al included several studies that found improvements in functional ability, with a decrease in around two seconds using this measure, after those with Parkinson disease participated in dance classes.<sup>1</sup>

### Program Description

Participants in Tango for Two will meet twice a week for 10 weeks to dance and perform lower extremity strengthening exercises.<sup>1</sup> The classes will last an hour and a half each. The first hour will include tango dance while the last half hour will focus on lower extremity strengthening exercises.<sup>1</sup>

Lower extremity exercises will include sit to stands and resisted lower extremity exercises using a theraband. The participants would perform three sets of 8 to 12 repetitions at 20% of the individual's one repetition maximum at the beginning of the program and would progress throughout as the exercise becomes easier for the individual.<sup>9</sup> Specific lower extremity exercises would include hip flexion, knee extension, and ankle dorsiflexion. Participants will be assessed before starting the program and after program completion utilizing the self-reported falls, Berg Balance Scale, 30 second sit to stand, Parkinson's Disease Questionnaire-39, and Timed Up and Go measures to determine the participants' improvements and goal accomplishment.

## Program Evaluation

Goal accomplishment will be determined by measuring improvements in the outcome measures for the program. The participants' initial falls incidence and Parkinson's Disease Questionnaire-39 score will be recorded along with their performance on the Berg Balance Scale, 30 second sit to stand test, and Timed Up and Go measures. All outcome measures will be evaluated after completion of the 10-week program. Future changes to Tango for Two will be considered if goals are not met as the program's intensity or duration may need to be adjusted depending on the results of the evaluation materials.

A survey will also be issued to program participants and caregivers after program completion to assess their opinions as stakeholders in the program and gather suggestions for future implementation. Questions will be included regarding the patient's feelings of self-efficacy and social support at the completion of the program compared to before the program started. This survey will also inquire about the benefits the family and caregivers have noticed as a result of the program and how the program could better serve both the individual and caregivers' needs. Tango for Two will then be adjusted based on the results in order to optimally assist those with Parkinson disease and their caregivers.

Additionally, the decreased use of the healthcare system and cost savings will be considered given the results of decreased falls and improved mobility. Providing this information to neurologists and other Parkinson disease specialists may assist in further decreasing healthcare costs by recommending that suitable patients attend Tango for Two rather than use expensive medications or experience decreases in mobility earlier

necessitating nursing home placement.

## References:

1. Shanahan J, Morris ME, Bhriain ON, Saunders J, Clifford AM. Dance for people with Parkinson disease: what is the evidence telling us? *Arch Phys Med Rehabil* 2015;96(1):141-153. doi:10.1016/j.apmr.2014.08.017.
2. Sharp K, Hewitt J. Dance as an intervention for people with Parkinson's disease: a systematic review and meta-analysis. *Neurosci Biobehav Rev* 2014;47:445-456. doi:10.1016/j.neubiorev.2014.09.009.
3. Watts JJ, McGinley JL, Huxham F, et al. Cost effectiveness of preventing falls and improving mobility in people with Parkinson disease: protocol for an economic evaluation alongside a clinical trial. *BMC Geriatr* 2008;8:23. doi:10.1186/1471-2318-8-23.
4. Dollar Cost of Parkinson's Underscores Need for Research - Parkinson's Disease Foundation (PDF). Available at: [http://www.pdf.org/en/science\\_news/release/pr\\_1363095060](http://www.pdf.org/en/science_news/release/pr_1363095060). Accessed November 11, 2016.
5. Lötze D, Ostermann T, Büssing A. Argentine tango in Parkinson disease--a systematic review and meta-analysis. *BMC Neurol* 2015;15:226. doi:10.1186/s12883-015-0484-0.
6. Glanz K, Rimer BK, Viswanath K: How Individuals, Environments, and Health Behaviors Interact. Chapter IX in *Health Behavior Theory, Research, and Practice* Sallis (Edited by Kelder SH, Hoelscher D, Perry CL), 5<sup>th</sup> ed, Jossey-Bass, San Francisco, pp 159-181, 2015.
7. Berg Balance Scale. Rehabilitation Measures Database. <http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=888>. Accessed December 9, 2016.
8. 30 Second Sit to Stand Test. Rehabilitation Measures Database. <http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=1122>. Accessed November 11, 2016.
9. Cadore EL, Rodríguez-Mañas L, Sinclair A, Izquierdo M. Effects of different exercise interventions on risk of falls, gait ability, and balance in physically frail older adults: a systematic review. *Rejuvenation Res* 2013;16(2):105-114. doi:10.1089/rej.2012.1397.