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Dancing through Parkinson's: Investigating the Impact of Argentine Tango on Motor, Cognitive and Psychosocial Function

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Background and Objective

Falls are a major source of disability in people with PD, with ~70% falling per year and 40% likely to have recurrent falls the next year.[1]

Increased fall risk due to an interplay between PD's **progressive motor and non-motor symptoms**. [2,3]

1. Rigidity
2. Bradykinesia
3. Tremors
4. Freezing of gait
5. Postural instability

1. Cognitive impairment
2. Mood disturbances
3. Autonomic Dysfunction
4. Impaired executive functioning

Many exercise programs (aerobic training, weightlifting, yoga, and tai chi) have been touted for improving postural deficits, but recent evidence suggests that **dance is a novel and more effective therapy for people with PD**[4].

Goal: Explore a specific form of dance (**Argentine Tango or AT**) as a potential PD-impairment targeted therapy through a meta-analysis of recent developments.

Domain	Motor Tests [5-21]	Potential Mechanisms
Balance	Mini-BESTest Berg Balance Scale Fullerton Advanced Balance One-Legged Stance Test Activities-Specific Balance Confidence Scale	AT group must maintain their body over their axis and attune to their partner's motions by shifting their weight with each step. Subtle weight shifts and changes in direction require robust proprioceptive feedback and strengthening of postural stabilizers. Improvements can also be attributed to AT's demand on the participants to learn, store in memory, recall, use and be cognizant of spatial postures, relationships, patterns, and paths.[9]"
Gait	Timed Up and Go (TUG) 6-Minute Walk Test (6MWT) Forward Gait Velocity Backward Gait Velocity Freezing of Gait Questionnaire (FOG) GAITRite Falls Efficacy Scale	Improvements attributed to tango's extensive speeds and coordination that encourage dancers to test their speed limitations. Tango also improves dancers' ability to increase stride length backward or forwards confidently and consequently the partners' ability to match the strides and timing of the leader. Both AT and control groups show increased confidence in their ability to not fall during daily activities while participants in the exercise group rate similar confidence to baseline
Disease Severity	MDS-UPDRS Motor Experiences of Daily Living MDS-UPDRS Motor Examination	Specific components of MDS-UPDRS-3 scale indicate AT has a broader impact on motor symptom progression rather simply improving gait and balance[6]. However, disease severity reduction is not significant in all the studies [5,11,12]. The difference between the non-trivial and trivial results can potentially be due to the duration of the intervention. Previous studies that showed significant improvements have had longer training regiments (i.e. 6-12 months)[6,16]

Domain	Cognitive Tests [5-21]	Potential Mechanisms
Visuospatial Cognition and Executive Functioning	Montreal Cognitive Assessment (MoCA)	MoCA scores showed non-significant improvements, indicating AT may not reverse mild cognitive impairment but may still have a protective role in its progression.
	Brooks Spatial Memory	Improvement on Brooks Spatial test 10–12-week post-intervention in AT group compared to Education group suggests that motor training plays a strong role in visuospatial cognition. AT assists with developing depth perception and gauging distance, both of which are impaired in PD and contribute to Fall risk

Domain	Psychosocial Tests [5-21]	Potential Mechanisms
Depression	Beck Depression Inventory	Depression does not improve significantly[6,7,8,10,13] but Romenets et al showed that AT participants felt less fatigue compared to the active control group[5].
Health Associated QOL	MDS-UPDRS Non-Motor Experiences of Daily Living	AT allows for a higher level of daily challenge and social engagement that prevents disease progression and improves QOL and ADL. The social setting in AT also provides an opportunity for social interactions, new social norms that encourage healthy behaviors, and development of social networks

Methods

A comprehensive literature review is conducted to explore PD's influence on falls and the impact of AT on people with PD. This is accomplished using databases such as PubMed, SCOPUS, and Embase. The following string of search terms are used to identify peer-reviewed articles in each database: "Parkinson's Disease" AND "exercise OR dance OR tango OR Argentine tango" AND "freezing of gait OR balance OR falls" OR "Hackney" OR "cognitive" OR "motor" OR "psychosocial".

Reviewed studies on the effectiveness of AT for PD patients PD are RCTs and are conducted after the year 2007. We include participants that met the following criteria: PD patients between the Hoehn Yahr stages of I-IV, patients above 60 years of age, and both sexes.

Dr. Madeleine E. Hackney (left), an associate professor in the Emory School of Medicine and Research Scientist with the Center for Visual and Neurocognitive Rehabilitation at Atlanta VA, has pioneered AT geared towards patients with movement-related diseases and caregivers [27]

Conclusion

We suggest that AT is a viable PD intervention because it demands participants to learn, store in memory, recall, use and be cognizant of spatial postures, relationships, patterns, and paths[15] to improvise and create rhythmic patterns. Furthermore, AT offers both motor and cognitive challenges through low-level aerobic activity and movements that challenge gait and balance while also requiring high-level multitasking and visuospatial understanding in the presence of external and internal cues. Studies show **long-term participation in partnered AT benefits people with PD by improving motor, cognitive and psychosocial effects.** AT's social engagement factor and its enjoyable skill-based exercise can help encourage long-term participation.

References