

## CRITICALLY APPRAISED TOPIC

### FOCUSED CLINICAL QUESTION

In an 87-year-old male with Parkinson Disease, is dance more effective than balance exercises for decreasing falls risk?

### AUTHOR

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### CLINICAL SCENARIO

An 87-year-old male with Parkinson Disease lives with his wife and has a CNA come twice a day to assist with showers, toileting, and transfers. The patient is able to propel his wheelchair and ambulates with minimal assistance of one and a rolling walker. The patient is homebound and has difficulty rounding the corners of his house due to his decreased balance. Taking a dance class may decrease the patient's falls risk while also increasing his participation in the community. Physical therapists may benefit from knowing if dance is more effective than strengthening exercises in helping similar patients to this case improve their balance while increasing community participation.

### SUMMARY OF SEARCH

- Three electronic databases were searched and 10 articles, including 6 systematic reviews and 4 randomized controlled trials, were identified for review that met the inclusion and exclusion criteria.
- Three of the systematic reviews were chosen for further evaluation based on quality and pertinence to the clinical question. The evidence supports:
  - Dance as an effective intervention for improving balance in those with Parkinson disease, however, does not indicate that dance is superior to balance exercises.
  - Dance as a more effective intervention for improving balance in those with Parkinson disease when compared to no intervention, education, physiotherapy, and the following forms of exercise: self-directed, breathing, stretching, sitting and standing, strength, balance, flexibility, resistance, chair, core, dexterity, and Tia chi.
- However, the reviews do not directly compare dance to balance exercises alone.

### CLINICAL BOTTOM LINE

Current best evidence suggests that dance is effective in improving balance in those with Parkinson disease and is a more effective intervention than those mentioned in the research. This should be taken into account when determining the interventions to use with this patient population for optimal balance improvements. Dance could be utilized as a physical therapy intervention to address balance or could be a potential community referral source for patients with Parkinson disease.

***This critically appraised topic has been individually prepared as part of a course requirement and has been peer-reviewed by one other independent course instructor***

## SEARCH STRATEGY

| Terms used to guide the search strategy                |                              |   |  |
|--|------------------------------|---|--|
| Patient/Client Group                                   | Intervention (or Assessment) | Comparison  | Outcome(s)   |
| Parkinson Disease<br>Parkinson's Disease<br>Parkinson* | Dance*<br>Tango              | Exercise<br>Training<br>Physical therapy<br>Physiotherapy | Balance<br>Fall risk<br>Falls risk<br>Risk of falls<br>Risk of falling |

### Final search strategy:

1. **Parkinson's Disease [MeSH Terms]**
2. Parkinson\* disease
3. **Danc\* OR tango**
4. **Exercise OR training OR "physical therapy" OR physiotherapy**
5. **Balance OR falls risk OR "fall\* risk" OR "risk of falls" OR risk of falling**
6. **#1 AND #3 AND #4 AND #5**
7. #2 AND #3 AND #4 AND #5
8. #1 AND #3 AND #5
9. #1 AND #4 AND #5
10. #2 AND #3 AND #5
11. #2 AND #4 AND #5

| Databases and Sites Searched  | Number of results   | Limits applied, revised number of results (if applicable)  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• <b>PubMed</b></li> </ul>   | <ul style="list-style-type: none"> <li>• <b>34</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>Parkinson's Disease MeSH Major Topic, exercise specified as "balance exercises" OR "exercises for balance", training specified as "balance training"</b></li> </ul>  |
| <ul style="list-style-type: none"> <li>• <b>CINAHL</b></li> </ul>   | <ul style="list-style-type: none"> <li>• <b>16</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>32 results</b></li> </ul>  |
| <ul style="list-style-type: none"> <li>• <b>Cochrane</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>41</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>Parkinson* Disease MJ Word in Major Subject Heading, exercise specified as "balance exercises" OR "exercises for balance", training specified as "balance training"</b></li> <li>• <b>7 results</b></li> <li>• <b>Exercise specified as "balance exercises" OR "exercises for balance", training specified as "balance training"</b></li> <li>• <b>28 results</b></li> </ul> |

## INCLUSION and EXCLUSION CRITERIA

| Inclusion Criteria   |
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| <ul style="list-style-type: none"> <li>• Published in English</li> <li>• Systematic reviews</li> <li>• Randomized controlled trials</li> </ul> |

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| <ul style="list-style-type: none"> <li>• Studied a population of adults 60 years or older with Parkinson Disease</li> <li>• Measured balance after participation in either dance or balance exercises</li> </ul> |
| <b>Exclusion Criteria</b>  |
| <ul style="list-style-type: none"> <li>• Studies that involve confounding secondary conditions</li> <li>• Case studies</li> <li>• Abstracts</li> <li>• Narrative reviews</li> </ul>                              |

## RESULTS OF SEARCH

### Summary of articles retrieved that met inclusion and exclusion criteria

| Author (Year)             | Study quality score | Level of Evidence | Study design  |
|---------------------------|---------------------|-------------------|---|
| Rios et al. 1 (2015)      | PEDro: 7/11         | 1b                | RCT   |
| Duncan et al. 2 (2012)    | PEDro: 8/11         | 1b                | RCT   |
| Lee et al. 3 (2015)       | PEDro: 7/11         | 1b                | RCT   |
| Lötzke et al. 4 (2015)    | AMSTAR: 8/11        | 1a                | Systematic review of 9 RCTs, two case studies, one non-RCT, and one uncontrolled pre-post study |
| Sharp et al. 5 (2014)     | AMSTAR: 8/11        | 1a                | Systematic review of RCTs   |
| Shanahan et al. 6 (2015)  | AMSTAR: 7/11        | 1a                | Systematic review of 8 RCTs, one quasi-RCT, and four cohort studies                             |
| Tomlinson et al. 7 (2013) | AMSTAR: 10/11       | 1a                | Systematic review of RCTs   |
| de Dreu et al. 8 (2012)   | AMSTAR: 8/11        | 1a                | Systematic review of RCTs   |
| Tomlinson et al. 9 (2014) | AMSTAR: 10/11       | 1a                | Systematic review of RCTs   |
| Hackney et al. 10 (2010)  | PEDro: 10/11        | 1b                | RCT   |

### BEST EVIDENCE

The following 3 studies were identified as the 'best' evidence and selected for critical appraisal. Reasons for selecting these studies were:

- **The study by Lötcke et al. 4 was selected as it has a high level of evidence with moderate quality and is a systematic review that was conducted recently discussing the effects of tango on balance in patients with Parkinson Disease.**
- **The study by Sharp et al. 5 was selected because it has a high level of evidence with moderate quality and systematically reviews the literature to compare the effects of dance versus exercise on balance in patients with Parkinson disease.**
- **The study by Shanahan et al. 6 was selected because it is a recent systematic review of the effects of dance on balance in patients with Parkinson disease and has a high level of evidence with moderate quality.**

## SUMMARY OF BEST EVIDENCE

### (1) Description and appraisal of *Argentine tango in Parkinson disease – a systematic review and meta-analysis* by Lötzke et al., 2015

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| <b>Aim/Objective of the Study/Systematic Review:</b>  |
| The aim was to summarize the current evidence regarding the effectiveness of Argentine tango as therapy to reduce the symptoms of those with Parkinson disease and to identify areas where additional research is needed.   |
| <b>Study Design</b>   |
| <ul style="list-style-type: none"><li>• Systematic review and meta-analysis</li><li>• Search Strategy<ul style="list-style-type: none"><li>○ A global literature search was conducted from December 2014 to January 2015 in the PubMed, CAMbase, AMED, and Google Scholar databases using the terms "(Parkinson OR Parkinson's disease) AND tango."</li></ul></li><li>• Selection Criteria<ul style="list-style-type: none"><li>○ Did not limit study design, publication year, disease stage, outcome, or age</li><li>○ Inclusion criteria: studies published in English or German</li><li>○ Exclusion criteria: opinion articles, documentations, theoretical essays, theses of Master or Bachelor level, and comments</li></ul></li><li>• Methods<ul style="list-style-type: none"><li>○ Publications found from the literature search were read by both authors to conclude whether the inclusion and exclusion criteria were met</li><li>○ Outcome data from eligible studies were converted to effect sizes and standard errors with an effect size of 0.2 to 0.49 being small, 0.5 to 0.8 moderate, and greater than 0.8 indicating a large effect</li><li>○ Meta-analysis was conducted for outcomes which were reported on in at least three studies, excluding case studies, and the Review-Manager Version 5 was used to process the data</li><li>○ Standard Chi<sup>2</sup>-tests were used to determine between trial heterogeneity while the I<sup>2</sup>-coefficient assessed the total percentage of variation due to heterogeneity</li><li>○ As blinding was not possible, quality assessments were conducted on the studies and any disagreements were solved by consensus</li></ul></li></ul> |
| <b>Setting</b>  |
| The types of settings in the individual studies are not summarized, however, it was noted that all studies excluding one case study took place in a group setting.  |
| <b>Participants</b>   |
| The review was conducted on 13 studies, 7 of which were included in the meta-analysis. These studies include 9 randomized controlled trials, two case studies, one non-randomized controlled trial, and one uncontrolled pre-post study. There were 10 to 75 participants in each study with the exception of the case reports which each included one person. The mean age of participants across studies from 63 to 86 years.   |
| <b>Intervention Investigated</b>  |
| <i>Control</i>  |
| Control activities included exercise classes, a pamphlet for home exercises, educational lessons, tango lessons without a partner, or no intervention. There were 20 exercise classes lasting one hour each over a period of 13 weeks and education lessons lasted one and a half hours each though the number of lessons was not specified. The time intervals were equivalent with the experimental group.  |
| <i>Experimental</i>   |
| The duration of the interventions ranged from two 3.45-minute dances for two sessions with a week break in between to a dance class for one hour two times a week for a year. In 10 studies participants danced with healthy individuals, in 10 studies the participants assumed the leading and following role, in 6 studies the   |

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| <p>participants changed partners, and in two studies participants danced with a partner and individually.</p>   |
| <p><b>Outcome Measures</b> (Primary and Secondary)</p>  |
| <p>A number of outcomes were reviewed however, for the purpose of this CAT, only the outcomes related to balance and falls risk were summarized. Balance measures included the Mini-BESTest, Berg Balance Scale, and the Activities-specific Balance Confidence Scale. Falls related to Parkinson disease were also measured.</p>   |
| <p><b>Main Findings</b></p>   |
| <p>The meta-analysis results were presented as standardized mean differences between Tango intervention and control groups.</p> <p><b>Mini BESTest:</b> The overall standardized mean difference (across 3 studies, total n=95) was 0.96 with a 95% confidence interval of 0.60-1.31 in favor of the Tango intervention. <math>I^2</math> of 0% indicating with low heterogeneity.</p> <p><b>Berg Balance Scale:</b> The overall standardize mean difference (across 3 studies, total n=89) was 0.45 with a confidence interval of 0.01-0.90 in favor of the Tango intervention. <math>I^2</math> of 39% indicating with moderate heterogeneity.</p> <p>The <b>Activities-specific Balance Confidence Scale</b> did not show significant improvements after intervention and there were no significant differences in falls related to Parkinson disease between groups.</p>  |
| <p><b>Original Authors' Conclusions</b></p>   |
| <p>The current evidence provides support for Argentine tango as a helpful approach for those with Parkinson disease with the potential to improve balance. Future research should include additional subjects and observe the long-term effects of Argentine tango.</p>   |
| <p><b>Critical Appraisal</b></p>  |
| <p><b>Validity</b></p>  |
| <p>The strengths of this systematic review are that it provides level 1a evidence based on the study design, includes an a priori design, comprehensive literature search, clear description of study characteristics, evaluation of the scientific quality of the studies was incorporated into the conclusion, and appropriate statistical methods were used to pool the study results. The factors decreasing the quality of this systematic review include the lack of a list or reference of excluded studies, assessment of publication bias, and acknowledgement of sources of support. Therefore, the systematic review scored an 8/11 on the AMSTAR providing moderate quality evidence for the clinical question. Additionally, the selection criteria for the studies did not limit the study design which may have yielded more results however the level of evidence of the individual studies is lower than if the authors would have limited the inclusion criteria to RCTs. The authors also did not limit the stage of disease or age of the participants, which may have altered the significance of the outcome. Finally, the participants were compared to controls performing self-directed exercise or were without a prescribed exercise program, which decreases the validity of the results.</p> |
| <p><b>Interpretation of Results</b></p>   |
| <p>Though the authors found a high effect of Argentine tango on balance according to the Mini-BESTest, the comparison between participants and those in the control groups who performed self-directed exercise or were without a prescribed program must be taken into account when interpreting these results. Therefore, this review is of moderate quality in support of using Argentine tango to improve balance in those with Parkinson disease, but does not indicate that this intervention is superior to balance exercise prescribed by the physical therapist. The clinical significance of the study is difficult to assess as the results are reported in standard mean differences rather than mean values. However, 0.96 is large and would likely be clinically significant. Additionally, the result of the Berg Balance Scale is moderate with a wide confidence interval meaning that the authors are moderately confident that the true score for balance is within a large range. This decreases the precision of the point estimate and the clinical significance of the result.</p>  |

**(2) Description and appraisal of *Dance as an intervention for people with Parkinson's disease: a systematic review and meta-analysis* by Sharp et al., 2014**

**Aim/Objective of the Study/Systematic Review:**

The aim was to determine the effectiveness of dance when compared to other exercises or no intervention for those with Parkinson's disease.

**Study Design**

- Systematic review and meta-analysis
- Search Strategy
  - A systematic literature search was conducted until the end of January 2014 in electronic bibliographic, dissertation, theses, and grey literature databases, the Cochrane library, conference abstracts and proceedings, journals, and reference lists of papers found using the terms "Parkinson\*", Danc\* and Random\*."
- Selection Criteria
  - Did not limit by date, language, outcome measures, age, gender, duration of disease or treatment, type of surgical or drug therapy, or impairment level
  - Inclusion criteria: RCTs comparing dance to other exercises or no intervention for those with Parkinson's disease
  - Exclusion criteria: Not specified. Studies were excluded if they did not meet the inclusion criteria.
- Methods
  - The authors independently searched the literature assessed for trial details and outcomes which were recorded
  - The methodological quality of the individual trials was determined using Cochrane Collaboration's tool for assessing the risk of bias
  - Outcome data were presented as standard deviations, means, and/or standard errors and if groups had similar interventions in a trial then the standard deviations and means were combined
  - Mean differences were found for all variables with the same outcome measure and standardized mean differences were found if outcome measures were comparable but not the same with both methods using a 95% confidence interval
  - The study utilized the fixed effects inverse variance model
  - The I<sup>2</sup> value was used to assess heterogeneity
  - The Review Manager 5.2 was used to analyse the data

**Setting**

The types of settings in the individual studies are not summarized.

**Participants**

- The review was conducted on 8 studies, 5 of which were included in the meta-analysis. All studies were RCTs and the three that were not included in the meta-analysis are ongoing trials.
- There were 19 to 62 participants in each study when adjusted for dropouts before the first assessment with the exception of the ongoing trials, one of which included 120 people and the others did not specify.
- The mean age of participants across studies from 63 to 71 years.
- Participants in the trials comparing dance to no intervention
  - Mean age: 68 years
  - Gender: 66% male
  - Mean Hoehn and Yahr stage: 2.3
  - Mean baseline unified Parkinson's disease rating scale (UPDRS) motor score: 34.9
  - Mean duration of disease: 7 years
  - 10 to 13 dropouts before the first assessment
- Participants in the trials comparing dance to other exercises
  - Mean age: 66.8 years
  - Gender: 67% male
  - Mean Hoehn and Yahr stage: 2.1
  - Mean baseline UPDRS: 26.7
  - Mean duration of disease: 7 years
  - 0 to 13 dropouts before the first assessment
  - One trial in this group did not provide these details

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| <b>Intervention Investigated</b>  |
| <i>Control</i>  |
| Control activities included breathing, stretching, sitting and standing, strength, balance, and dexterity exercises or no intervention. Exercise classes including Tia chi lasted one hour each twice a week for a total of 20 hours over 13 weeks and the physiotherapy exercise intervention lasted for one and a half hours for a total of 39 hours over 26 weeks.   |
| <i>Experimental</i>   |
| The duration of the interventions were one hour twice a week for a total of 20 hours over 13 weeks, one and a half hours for a total of 39 hours over 26 weeks, and one hour of dance for a total of 104 hours over 52 weeks. Three studies used the Tango, one used Tango and Foxtrot, and one used Irish dance as the intervention.   |
| <b>Outcome Measures</b> (Primary and Secondary)   |
| A number of outcomes were reviewed however, for the purpose of this CAT, only the outcome related to balance was summarized. The Berg Balance Scale was used to measure balance in this study.  |
| <b>Main Findings</b>  |
| <p><b>Berg Balance Scale:</b></p> <ul style="list-style-type: none"> <li>• Trials comparing dance to no intervention: The overall standardized mean difference (across 2 trials, total n=100) was 0.72 with a confidence interval of 0.31 to 1.14 in favor of the dance intervention. I<sup>2</sup> of 0% indicating no heterogeneity.</li> <li>• Trials comparing dance to other exercises: The overall mean difference (across 2 trials, total n=43) was 3.98 with a confidence interval of 1.52 to 6.44 in favor of the dance intervention. I<sup>2</sup> of 0% indicating no heterogeneity.</li> </ul>  |
| <b>Original Authors' Conclusions</b>  |
| The current evidence provides support for dance to provide short-term balance improvements that are clinically meaningful for those with Parkinson's disease. Future research should include well-designed RCTs that discern the long-term effects and optimal type and dose of dance and compare this intervention to other forms of exercise.   |
| <b>Critical Appraisal</b>   |
| <b>Validity</b>   |
| The strengths of this systematic review are that it provides level 1a evidence based on the study design, included an a priori design, comprehensive literature search including grey literature, included and excluded studies, description of study characteristics, evaluation of the scientific quality of the trials which was considered in the conclusion, and used appropriate statistical methods to pool the study results. The factors that decreased the quality of this systematic review were that there was not a procedure for consensus in place should the authors disagree nor was the publication bias assessed or the conflict of interest included. Therefore, this study scored an 8/11 on the AMSTAR providing moderate quality evidence for the clinical question. The selection criteria limited the study design to RCTs meaning that the individual trials are of level 1b evidence. Though the authors did not limit the age or stage of disease that the participants had it appears their characteristics were similar at baseline. Lastly, the participants in the experimental group were compared to controls performing no intervention, which could decrease the validity of the results. However, the study also showed improvements when the experimental group was compared to the control group performing exercises including physiotherapy and Tai chi. |
| <b>Interpretation of Results</b>  |
| Though the authors found that balance significantly improved with the dance interventions compared to the   |

control group with no intervention or participating in other exercises, the confidence intervals for the results of the Berg Balance Scale were wide. This means that the true score for balance may be found within a large range and decreases the precision of the point estimate. However, the large effect size increases the clinical significance of the study findings. Therefore, this review supports the use of dance to improve balance in those with Parkinson's disease when compared to other exercises or no intervention.

**(3) Description and appraisal of *Dance for people with Parkinson disease: what is the evidence telling us?* by Shanahan et al., 2015**

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| <p><b>Aim/Objective of the Study/Systematic Review:</b></p>  |
| <p>The objectives include reviewing the literature on dance for those with Parkinson disease and providing the specific parameters used. The secondary objective is to assist with the development of studies in the future.</p>   |
| <p><b>Study Design</b></p>   |
| <ul style="list-style-type: none"> <li>• Systematic review and meta-analysis</li> <li>• Search Strategy             <ul style="list-style-type: none"> <li>○ A literature search was conducted in April 2014 in MEDLINE, Allied and Complementary Medicine Database, Cumulative Index to Nursing and Allied Health Literature Plus, Sage, SPORTDiscus, PubMed, ScienceDirect, and PubMed Central and reference lists of papers found using the terms "Parkinson's disease" AND "dance."</li> </ul> </li> <li>• Selection Criteria             <ul style="list-style-type: none"> <li>○ Did not limit by disease stage</li> <li>○ Inclusion criteria: peer-reviewed, published within last 15 years, participants have diagnosis of idiopathic Parkinson disease, disease stage measured by Hoehn and Yahr staging scale, include 2 or more participants, evaluated dance intervention outcomes for those with Parkinson disease and described this intervention, FITT (frequency, intensity, time/duration and type) principle used, and the effect on outcomes of interest</li> <li>○ Exclusion criteria: Not specified. Studies were excluded if they did not meet the inclusion criteria.</li> </ul> </li> <li>• Methods             <ul style="list-style-type: none"> <li>○ Articles found from the literature search were read by two reviewers to conclude whether the inclusion criteria were met and these articles were evaluated for intervention details and outcomes</li> <li>○ The quality of the individual studies was determined using the PEDro Scale for the included RCTs and quasi-RCTs and the Newcastle-Ottawa Quality Assessment Scale for Cohort Studies was used for the cohort studies included</li> <li>○ The Comprehensive Meta-analysis Software was used to produce forest plots of outcomes for RCTs and quasi-RCTs to compare between-group differences</li> <li>○ The measurement tool that was most used for a given outcome was chosen and included in the forest plot for that outcome of interest</li> <li>○ An exploratory meta-analysis was performed for individual forest plots</li> </ul> </li> </ul> |
| <p><b>Setting</b></p>  |
| <p>The types of settings in the individual studies are not summarized.</p>   |
| <p><b>Participants</b></p>   |
| <ul style="list-style-type: none"> <li>• The review was conducted on 13 studies, 5 of which were included in the meta-analysis. The studies included 8 RCTs, one quasi-RCT, and four cohort studies.</li> <li>• There were 11 to 75 participants in each study and dropouts ranged from 0 to 16.</li> <li>• The mean age of participants across studies from 61.6 to 74.4 years.</li> <li>• Hoehn and Yahr stages ranged from 1 to 2.5.</li> </ul>   |
| <p><b>Intervention Investigated</b></p>  |
| <p><i>Control</i></p>  |

Control activities included tango or exercise for those without Parkinson disease with two one-hour sessions a week for a total of 20 sessions in 13 weeks. More specifically, exercises included flexibility, strength, and chair exercises. The intensity of the interventions were progressive. Further control group activities were not specified. Other intervention activities included education, physiotherapy, tai chi, and breathing, dexterity, resistance, and core exercises. The duration of these interventions ranged from two one-hour sessions a week for a total of 20 sessions in 13 weeks to a half hour class once a week for six months. The intensity of these activities was progressive with the exception of one study that did not state the intensity of the interventions.

### *Experimental*

The duration of interventions ranged from 10 one and a half hour sessions in two weeks to two one-hour classes a week for 12 months. The intensity of the interventions ranged from low to progressive.

Type of dance included in studies

- Tango: 9 studies
- Irish set dancing: 1 study
- Waltz/foxtrot: 2 two studies
- Modern dance: 1 study
- Contact improvisation: 1 study
- Elements of jazz, ballet, contemporary, choreographic, and dance theatre: 1 study

### **Outcome Measures** (Primary and Secondary)

A number of outcomes were reviewed however, for the purpose of this CAT, only the outcome related to balance was summarized. The Berg Balance Scale measured balance in this systematic review and meta-analysis.

### **Main Findings**

#### **Berg Balance Scale:**

- The forest plot using the standard difference in means and a 95% confidence interval yields a point estimate that favors dance and does not include 0 in the interval estimate
- The results of three of the five studies included on the forest plot cross the no effect line and are therefore not significant

### **Original Authors' Conclusions**

The review provides evidence supporting balance improvements in those with mild to moderate Parkinson disease after participation one-hour dance classes twice a week for at least 10 weeks. Future research should evaluate the effects of other types of dance and the long-term effects of the intervention.

### **Critical Appraisal**

#### **Validity**

The strengths of this systematic review include that it provides level 1a and 2b evidence from the individual studies, which support the authors' conclusion. The review scored a 7/10 on the AMSTAR as it included an a priori design, had two individuals to extract data and a procedure for consensus, performed a comprehensive literature search, included individual study characteristics, evaluated the scientific quality of the studies included and incorporated it into the conclusion, and appropriately combined individual study findings. However, the quality of the study was decreased as grey literature, a list of excluded studies, assessment of publication bias, and the conflict of interest were not included. Therefore, this review provides moderate quality evidence for the clinical question. Though the selection criteria did not limit study design, the authors chose to exclude studies for the reason of study design and only included studies providing 1a and 2b level evidence. The authors did not limit the stage of disease however baseline characteristics appear similar between groups. The participants in the experimental group were compared to controls that either did not have Parkinson disease or did not specify the activities of the control group. However, if the control group has no intervention then this decreases the validity of the results.

## **Interpretation of Results**

The clinical significance of this study is difficult to assess as mean values and confidence intervals are not provided. However, the point estimate favors dance and does not include zero in the interval estimate so would likely be significant. Additionally, the absolute changes provided are superior for the experimental group when compared to the control group/other interventions according to the Berg Balance Scale. However, the lack of a specified intervention in many of the control groups must be taken into consideration when evaluating these results.

## **EVIDENCE SYNTHESIS AND IMPLICATIONS**

The evidence provided in the systematic review and meta-analysis by Lötze et al. 4 supports dance as being effective for improving balance in patients with Parkinson disease. However, this review does not indicate whether dance is superior to balance exercises rather that it would be beneficial to include in the treatment of balance issues in this patient population. The study by Sharp et al. 5 supports dance as an intervention for those with Parkinson's disease to improve balance, though this study compared dance to various interventions and not specifically balance exercises alone. Likewise, the study by Shanahan et al. 6 provides evidence for dance significantly improving balance in those with mild to moderate Parkinson disease more so than having no intervention or when compared to various other interventions. However, the study does not directly compare dance to balance exercises alone.

Therefore, it cannot be concluded that dance is more effective than balance exercises to decrease falls risk. However, this information can be applied to the patient case referred to in the clinical question. Incorporating dance into the individual's physical therapy intervention plan may help improve the patient's balance during daily activities while referring this patient to a program in the community would additionally increase his participation. The physical therapist should consider the effects of dance on balance compared to other interventions reviewed to determine the optimal activity for the individual patient. Future systematic reviews of RCTs should be completed to directly compare dance to balance exercises to discover which would be more effective in decreasing the falls risk in those with Parkinson disease.

## REFERENCES

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